AD

AD-E403 065

Technical Report ARAET-TR-05013

SHAPED CHARGE JET FLASH RADIOGRAPH DIGITIZATION

James D. Pham Ernest L. Baker Stanley DeFisher

September 2005



U.S. ARMY ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER

Armaments Engineering & Technology Center

Picatinny, New Jersey

Approved for public release; distribution is unlimited.

The views, opinions, and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy, or decision, unless so designated by other documentation.

The citation in this report of the names of commercial firms or commercially available products or services does not constitute official endorsement by or approval of the U.S. Government.

Destroy this report when no longer needed by any method that will prevent disclosure of its contents or reconstruction of the document. Do not return to the originator.

REPORT DOCUMENTATION PAGE

2. REPORT TYPE

1. REPORT DATE (DD-MM-YYYY)

Digitization

a. REPORT

Flash radiograph

c. THIS PAGE

16. SECURITY CLASSIFICATION OF:

b. ABSTRACT

Form Approved OMB No. 0704-01-0188

3. DATES COVERED (From - To)

The public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing the burden to Department of Defense, Washington Headquarters Services Directorate for Information Operations and Reports (0704-0188), 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.

PLEASE DO NOT RETURN YOUR FORM TO THE ABOVE ADDRESS.

4. TITLE AND SUBTITLE			
	5a. CONTRACT NUMBER		
Shaped Charge Jet Flash Radiograph Digitization	5b. GRANT NUMBER		
	5c. PROGRAM ELEMENT NUMBER		
6. AUTHORS	5d. PROJECT NUMBER		
James D. Pham, Ernest L. Baker, and Stanley DeFisher	5e. TASK NUMBER		
	5f. WORK UNIT NUMBER		
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) U.S. Army ARDEC, AETC Energetics, Warheads & Environmental Technology (AMSRD-AAR-AEE-W) Picatinny, NJ 07806-5000	8. PERFORMING ORGANIZATION REPORT NUMBER		
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)	10. SPONSOR/MONITOR'S ACRONYM(S)		
U.S. Army ARDEC, EM Technical Research Center (AMSRD-AAR-EMK) Picatinny, NJ 07806-5000	11. SPONSOR/MONITOR'S REPORT NUMBER(S) Technical Report ARAET-TR-0501		
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution is unlimited.			
13. SUPPLEMENTARY NOTES			

Shaped charge jet

17. LIMITATION OF

SAR

ABSTRACT

Jet characterization

18. NUMBER

PAGES

44

OF

Standard Form 298 (Rev. 8/98) Prescribed by ANSI Std. Z39.18

Breakup time

19a. NAME OF RESPONSIBE PERSON

19b. TELEPHONE NUMBER (Include area

code) (973) 724-4818

J. Pham, E. Baker, and S. DeFisher

CONTENTS

		Page
Intro	roduction	1
Digi	nitization for Flash Radiographs of Shaped Charge Jet	1
	Naming and Numbering Convention Film Digitization Interpolation and Extrapolation Films Longer than Digitizer Tablet	2 2 2 2
Har	rdware	3
Con	mputer Code	3
	Input Parameters Output Parameters Calculation	3 5 5
Disc	cussions	12
Ass	sumptions	19
Con	mparison to the 2-D CALE Hydrocode	19
Con	nclusions	20
App	pendix - Output from Program No. 1, Input to Program No. 2	21
Refe	ferences	39
Dist	tribution List	41
	FIGURES	
1	Typical x-ray of a shaped charge jet	
2	Digitizing scheme of jet particles	2
3	Long film on digitizing tablet	3
4	Input screen	4
5	Accumulated length versus velocity	7
6	Accumulated mass versus velocity	8
7	Volume calculation	9

FIGURES (continued)

		Page
8	Accumulated energy versus velocity	10
9	Breakup time versus velocity	10
10	Q versus velocity	11
11	Accumulated mass versus velocity from shaped charge digitization code and 2-D CALE hydrocode	19
	TABLES	
1	Digitization output	12
2	Average $\overline{\mathcal{Q}}$ values for copper lined devices	16
3	Average $\overline{\mathcal{Q}}$ values for molybdenum lined devices	17
4	Average $\overline{\mathcal{Q}}$ values for tungsten lined devices	17
5	Average t_b/D values for copper lined devices	17
6	Average t_b / D values for molybdenum lined devices	18
7	Average t_b/D values for tungsten lined devices	19

INTRODUCTION

Although shaped charge jet mass and momentum characteristics can be accurately simulated and tailored using high rate continuum modeling, the subsequent break-up of a shaped charge jet is currently simulated using empirically based models. These models are used to predict jet break-up time, jet length, and jet penetration capability. Shaped charge warheads are designed using the hydrocode simulation and subsequently tested, and flash radiographs of the shaped charge are obtained. Flash radiograph data are essential to shaped charge design for determination of the jet characteristics, which are not readily available from the hydrocode simulation results. In order to quantify the results of these warheads, the flash radiograph digitization of shaped charge jets are done to provide warhead designers with the data required for these empirically based models. The quantified results of the jet characterization are also used for comparison with high rate continuum modeling performed during warhead design optimization with different liner contours, explosives, and liner materials.

DIGITIZATION FOR FLASH RADIOGRAPHS OF SHAPED CHARGE JET

Since a shaped charge jet tip goes faster than its rear, the jet stretches and eventually breaks up. Typically, shaped charge jet radiographs are taken at least 20 charge diameter distance to allow time for the jet to break up. Flash radiographs are normally taken so that the tip of the jet is captured in the earliest time, and the particles with velocities around 3 km/s were captured in the latest film. Other flash radiographs are taken between these times to capture the middle part of the jet. The jet images are laid on the digitized tablet and the entire jet is digitized. Typical flash x-rays are shown in figure 1.

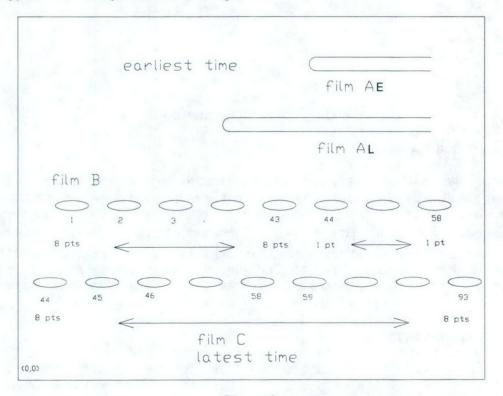


Figure 1
Typical x-ray of a shaped charge jet

Naming and Numbering Convention

Films are named from the earliest to the latest times: A_E , A_L , B, and C. The tip particle is numbered as 1 and continued to the end of the jet.

Film Digitization

Using the typical films as shown in figure 1, the digitization scheme is as follows:

- Particles 1 to 43 in film B are digitized for eight points for each particle.
 From particles 44 to 58, only 1 point is digitized (fig. 2).
- In film C, eight points for each particle are digitized for all particles from 44 to 93.
- In film A_F and A_I, only the tips (one point each) are digitized.

Note that the eight point/one point digitization scheme is done to reduce the digitization time. Alternately, eight points can be taken for every particle in films B and C and the average values can be taken.

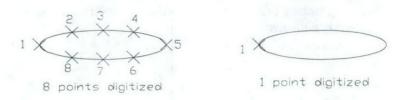


Figure 2
Digitizing scheme of jet particles

Interpolation and Extrapolation

A shaped charge jet is typically very long compared to the x-ray films, especially in larger shaped charge warheads. Therefore, only the tip portion of the jet is shown on film B and the rear portion is on film C, with a few common particles in both films. In this example, the velocity of the tip was determined by the films A_E and A_L . The velocities of particles 44 to 58 are also known from films B and C, but the velocities of the rest of the particles are determined by the interpolation (particles 2 to 43) and extrapolation (particles 59 to 93) based on their positions. Both interpolation and extrapolation methods are fitted to the first order equation and based on the virtual origin theory (ref. 1).

Films Longer Than the Digitized Tablet

Some films are longer than the digitized tablet. In this case, the computer code asks for the references A and B. The film is then slid to the left, until point B coincides with point A, and digitized until the end of the film (figure 3). This allows for film digitization of longer than the tablet. The code will automatically keep track of the references and update the new positions of the jet particles.

The code will automatically keep track of the references and update the new positions of the jet particles.

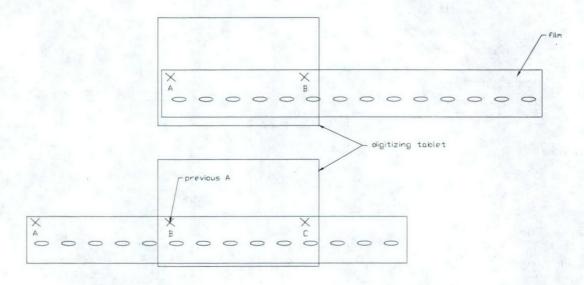


Figure 3 Long film on digitizing tablet

HARDWARE

The films are digitized using CALCOMP model 9500 digitizing tablet. It has the resolution of 0.25×10^{-3} in., accuracy of ± 0.003 in. and about 6 ft in length. The digitized tablet is connected to a computer via a serial com port. Films are placed and taped in place. A digital input device was placed on the film and manually recorded the data.

COMPUTER CODE

The digitization code consists of two programs. Both were written in VISUAL BASIC, version 6. The first program digitizes the jet radiographs into x, y coordinates and the references, and writes these data to an output file named AP_FILE.TXT. The sample file is included in the appendix. The second program reads this file in addition to the input entered in figure 4 and calculates the jet parameters.

Input Parameters

Input parameters are required to be filled in as shown in figure 4.

X-ray: Enter x-ray number (information purpose)

					1 2	
XRAY: NHN1-	2	Market Market				
Scale Factor, A early	.9	Time A early (us)	701.9			
Scale Factor, A late	.9	Time A late (us)	732			
Scale Factor, B	.9	Time B (us)	701.9			
Scale Factor, C	.9	Time C (us)	1001.5			
Last particle in B	58					
First particle in C	44	— Warhead C				
Lest perticle in C	93					
Liner Material		✓ Wave S Size (mm)[1				
Moly, den 10.20 g/ Silver, den 10.43 g/ Other	/cc					
ОК		Can	cel			

Figure 4 Input screen

• Scale factors A_E , A_L , B, and C: Images on the x-ray films are larger than the particles. Therefore, the measurements are adjusted to the scale factor. A rod with knots with known distance is placed in the shot line and an image taken prior to detonating the warhead. Scale factor of film B, for example, is equal

$$SF_B = \frac{disRod}{disMeasured}$$

where

disRod is the known distance on rod, usually 50 mm disMeasured is the measured distance on x-ray B

- Last particle in B, first particle in C, last particle in C: In this example, they are 58, 44, 93, respectively.
- Liner material: Liner material is chosen by selecting in the menu, or it can be chosen as "other", in which case, density in g/cm³ is entered in the box.
- Time A_E , A_L , B, C: Enter times of A_E , A_L , B, and C films.

 Warhead configuration: This is for informational purposes only. Click on the appropriate boxes and enter the size of the warhead.

Output Parameters

The code provides both tabulated tables of particle angles, maximum and average jet diameters, velocities, accumulated mass, accumulated length, accumulated energy, break up times, ductility factor numbers (Q), average breakup time, average Q factor as well as plots of accumulated length versus velocity, accumulated mass versus velocity, accumulated energy versus velocity, Q versus velocity, and breakup time versus velocity.

Calculation

Nomenclatures

 A_E = x coordinate of early A film A_E = x coordinate of late A film

 V_{τ} = Jet tip velocity

 \bar{t}_b = Average break up time (μ s)

 $t_b(V)$ = Breakup time as a function of V

 SF_{A_E} = Scaled factor of early film in A

 SF_A = Scaled factor of late film in A

 SF_B = Scaled factor of film B

 SF_c = Scaled factor of film C

 $\sum L$ = Accumulated jet length (cm)

 $\sum M =$ Accumulated jet mass (g)

 $\sum E = \text{Accumulated energy (KJ)}$

L(V) = Accumulated jet length as a function of V

M(V) = Accumulated jet mass as a function of V

 L_p = length of a jet particle = $x_5 - x_1$

 M_p = mass of a jet particle

 E_p = energy of a jet particle

 ΔV = Difference of tip and tail velocity (cm/ μ s) \overline{O} = Average ductility number ($cm^{1/3}\mu s^{1/3}g^{1/3}$)

Q(V) = Instantaneous ductility number as a function of V

 α = angle of jet particle (deg)

 ρ = density (g/cm³)

Vol = Volume of a jet particle (cm³) $\overline{\phi}$ = average jet particle diameter

 ϕ_{max} = maximum jet particle diameter

 x_5 = x coordinate of point 5 of a particle

 x_1 = x coordinate of point 1 of a particle y_1 = y coordinate of point 1 of a particle

 y_5 = y coordinate of point 5 of a particle

Jet Velocity

Jet velocity of the tip (V_T) is calculated by taking the coordinates of the tips in films $A_{\scriptscriptstyle E}$ and $A_{\scriptscriptstyle L}$.

$$V_T = \frac{A_E S F_{A_E} - A_L S F_{A_L}}{t_L - t_E}$$

Since there is no information available for particles 2 to 43 to calculate the velocities for these particles, the velocities are interpolated based on the known positions of these tips. In this example, particles 1 and 44 to 58, in film B, are used to find the position as a function of velocity. A first order fit is used to find the missing velocities based on their positions. Similarly, velocities of particles 59 to 93 are extrapolated using the function fitted by particles 44 to 58 based on film C.

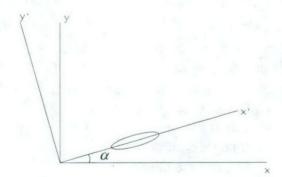
Axes Transformation

Since many particle orientations in a shaped charge jet are not lined up with the digitizer axis, axis transformation is used such that

$$x' = x \cos \alpha + y \sin \alpha$$
$$y' = y \cos \alpha - y \sin \alpha$$

where

$$\alpha = \tan^{-1} \left(\frac{y_5 - y_1}{x_5 - x_1} \right)$$



The particle lengths and mass use the transformed axis.

Accumulated Length versus Velocity (fig. 5)

Accumulated length is calculated for breakup time. Lengths of particles 1 to 43, in film B in figure 1, are added by taking the difference of x coordinates of point 5 and point 1 of each particle (the other points are used subsequently for volume calculation). The same scheme is applied for film C where lengths of particles 44 to 93 are added to the previous accumulated length in film B.

$$\sum L = \sum_{particle 1}^{particle 43} L_p + \sum_{particle 2}^{particle 93} L_p$$
Film B Film C

The accumulated length is then fitted to the second order with the velocity.

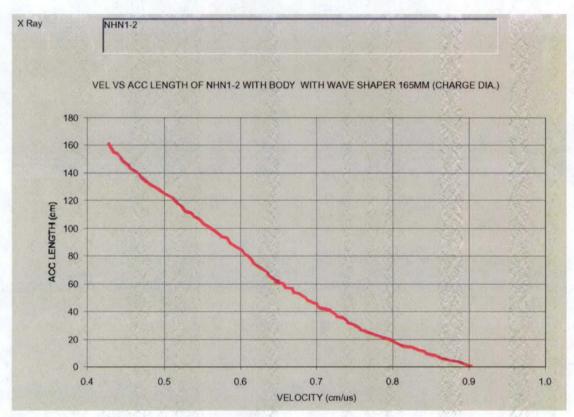


Figure 5
Accumulated length versus velocity

Accumulated Mass versus Velocity (fig. 6)

Jet mass is also calculated to find the kinetic energy of the jet for the penetration calculation.

Volumes of particles 1 to 43 in film B in figure 1 are added by taking the x and y coordinates of points 1 through 8 of each particle. The same scheme is applied for film C where volumes of particles 44 to 93 are added to the previous accumulated volume.

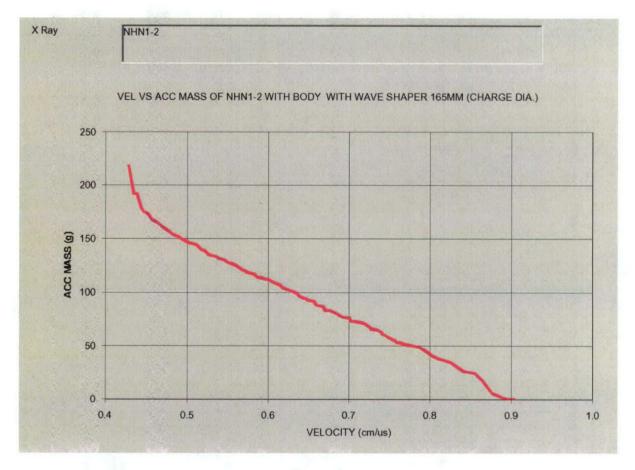


Figure 6
Accumulated mass versus velocity

Assuming the round cross section, the volume of a particle is calculated based on the eight points digitized. The top curve $[f_1(x)]$, is composed of five points, from 1 to 5, and the bottom curve $[f_2(x)]$, is also composed of five points with point 1 and 5 as in the top curve and points 6, 7, and 8 (fig. 7) as the bottom curve. These curves are fitted to the second order equations, where $f_1(x) = a_1x^2 + b_1x + c_1$ and $f_2(x) = a_2x^2 + b_2x + c_c$. Let

$$\Delta A = a_1 - a_2, \ \Delta B = b_1 - b_2, \ \Delta C = c_1 - c_2$$

$$Vol = \int_{x_1}^{x_5} \frac{\pi}{4} \left(\Delta A x^2 + \Delta B x + \Delta C \right)^2 dx$$

$$= \frac{\pi}{4} \left[\frac{\Delta A^2}{5} x^5 + \frac{\Delta A \Delta B}{2} x^4 + \frac{2\Delta A \Delta C + \Delta B^2}{3} x^3 + \Delta B \Delta C x^2 + \Delta C^2 x \right]_{x_1}^{x_5}$$

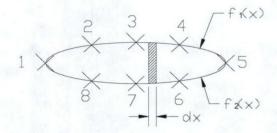


Figure 7
Volume calculation

and

$$\begin{split} \boldsymbol{M}_{p} &= \rho Vol\\ \sum \boldsymbol{M} &= \sum_{particle 1}^{particle 43} \boldsymbol{M}_{p} + \sum_{particle 44}^{particle 93} \boldsymbol{M}_{p}\\ &\quad \text{Film B} \quad \text{Film C} \end{split}$$

The accumulated mass is then fitted to the second order with the velocity to find M(V) for subsequent calculations.

Accumulated Energy versus Velocity (fig. 8)

$$\sum E = \sum_{particle \, 1}^{particle \, 43} \frac{1}{2} M_p V^2 + \sum_{particle \, 44}^{particle \, 93} \frac{1}{2} M_p V^2$$
Film B
Film C

Break Up Time versus Velocity (fig. 9)

Average breakup time and instantaneous breakup time are calculated based on the accumulated length. Breakup time predicts the jet penetration performance because penetration performance is reduced if the jet breaks up too early.

Average and instantaneous breakup times are estimated below

$$\bar{t}_b = \frac{\sum L}{\Delta V}$$

$$t_b(V) = \frac{dL}{dV}$$

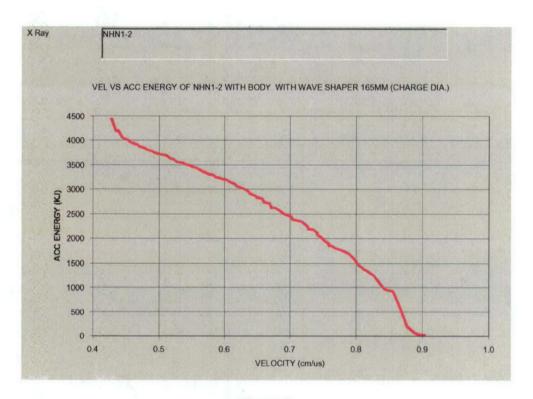


Figure 8
Accumulated energy versus velocity

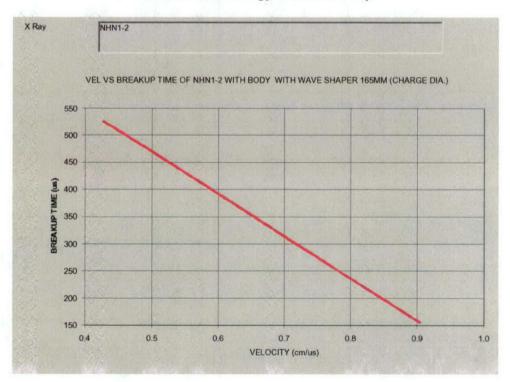


Figure 9 Breakup time versus velocity

Jet Ductility Number Q (fig. 10)

Both average jet ductility and instantaneous numbers are estimated next. The ductility number is of great interest because it shows the correlation of the jet performance with increased Q number. Reference 2 shows the relationship

$$\overline{Q} = t_b \left(\frac{\pi \Delta V}{\sum M_p} \right)^{1/3}$$

$$Q(V) = t_b \left(\frac{1}{\pi} \frac{dM}{dV} \right)^{-1/3}$$

$$Q(V) = t_b \left(\frac{1}{\pi} \frac{dM}{dV}\right)^{-1/3}$$

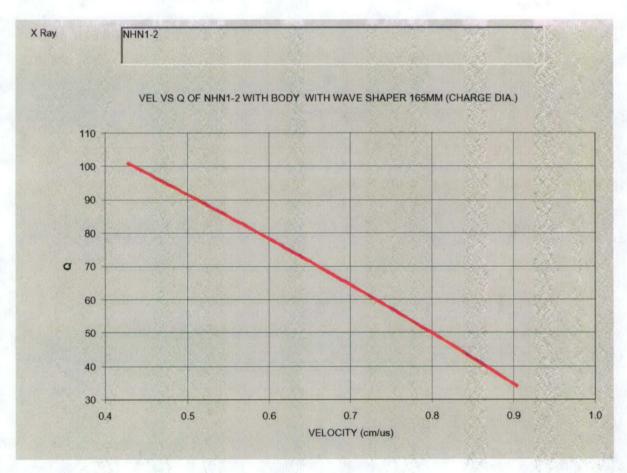


Figure 10 Q versus velocity

Maximum Jet Diameter and Average Jet Diameter

Jet diameter information provides a quick look on how well the jet performs in penetration and other calculations for jet properties (ref. 2).

$$\phi_{\text{max}} = f_1(\overline{x}) - f_2(\overline{x})$$

where

$$\overline{x} = \frac{x_1 + x_5}{2}$$

The average jet diameter is estimated based on the assumption of the jet particle being a cylinder. Hence

$$\overline{\phi} = 2\sqrt{\frac{Vol}{\pi L_p}}$$

where

$$L_p = x_5 - x_1$$

DISCUSSIONS

Table 1 shows the tabulated form of the output from the code. The output lists all the jet parameters of interest. Note that particle 0 is the tip velocity, which is taken from the earlier films (films A_E and A_L), and particle 1 uses this value. (In case only one A film is available, the tip velocity is taken from films A and B). Results from digitized data are compiled over the years for various liner materials and sizes. Tables 2 through 4 show the average Q values for copper, molybdenum, and tungsten, respectively. Although the average Q value varies with different configurations such as with a wave shaper, or with the body, or with different explosive, it is higher with copper than with molybdenum or tungsten liners.

Table 1 Digitization output

Test Number NHN1-2 Density 10.49 g/cm³

The scale factor of A (EARLY) film: 0.9 The scale factor of A (LATE) film: 0.9

The scale factor of B film: 0.9 The scale factor of C film: 0.9 Last particle in film B: 58 First particle in film C: 44 Last particle in film C: 93

Early time A: 701.9 µs (micro-seconds)

Late time A: 732 µs Time B: 701.9 µs Time C: 1001.5 µs

12

Table 1 (continued)

	Angle	Diamet		Velocity	Acc. length	Acc. Mass	Acc. Energy	Breakup	Q
No.	(deg)	Max.	Min.	(cm/µs)	(cm)	(g)	(KJ)	(µs)	C. N
0	N/A**	N/A**	N/A**	0.903	N/A**	N/A**	N/A**	N/A**	N/A*
1	36	0.48	0.35	0.903	0.598	0.606	25.13	156.1	34.
2	-59	0.16	0.11	0.897	1.232	0.685	27.89	160.7	35.0
3	-25	0.13	0.10	0.895	1.829	0.729	29.68	162.6	35.4
4	12	0.40	0.30	0.888	3.309	1.802	71.95	168.1	36.
5	11	0.78	0.57	0.877	4.536	5.098	198.68	176.5	38.2
6	46	1.31	0.98	0.864	6.138	17.694	669.11	186.4	40.2
7	2	0.86	0.63	0.855	8.281	24.653	923.67	193.3	41.0
8	-49	0.80	0.83	0.845	9.457	25.775	963.68	201.7	43.3
9	30	0.47	0.19	0.842	10.974	26.225	979.62	203.9	43.
10	-15	0.23	0.19	0.865	12.219	29.641	1,098.67	209.2	44.
11	36		0.55	0.826	14.054	34.166		216.2	46.
12		0.74					1,253.00		
13	4 49	0.92	0.69	0.814	14.824	37.173 37.972	1,352.75	225.1	47.8
	-47	0.45	0.33	0.811	15.702		1,378.99	227.9	48.4
14		0.54	0.39	0.807	16.713	39.258	1,420.91	230.7	48.9
15	52	0.52	0.38	0.804	17.594	40.319	1,455.17	233.5	49.5
16	-18	0.63	0.47	0.799	18.970	42.783	1,533.82	237.0	50.
17	-14	0.70	0.51	0.795	20.002	44.989	1,603.56	240.0	50.7
18	3	0.71	0.53	0.788	21.332	48.085	1,699.58	246.0	51.8
19	-10	0.49	0.37	0.780	22.780	49.702	1,748.80	251.6	52.9
20	36	0.42	0.31	0.772	24.260	50.887	1,784.11	258.0	54.
21	27	0.53	0.39	0.767	25.061	51.875	1,813.16	262.2	54.9
22	-12	0.47	0.34	0.763	26.239	53.018	1,846.43	264.9	55.4
23	60	0.25	0.19	0.758	26.879	53.199	1,851.63	268.6	56.
24	42	0.61	0.45	0.758	27.913	54.902	1,900.54	269.1	56.2
25	-27	0.54	0.39	0.753	29.047	56.346	1,941.50	272.6	56.9
26	-30	0.49	0.36	0.748	30.829	58.278	1,995.54	276.7	57.6
27	1	0.70	0.53	0.745	31.391	59.601	2,032.26	279.1	58.
28	-22	0.80	0.60	0.742	31.807	60.827	2,065.97	281.7	58.0
29	29	0.55	0.40	0.741	33.053	62.479	2,111.29	282.2	58.
30	-1	0.47	0.35	0.734	35.610	65.002	2,179.32	287.3	59.6
31	4	0.47	0.35	0.727	36.107	65.512	2,192.83	292.7	60.6
32	4	0.50	0.37	0.726	37.720	67.324	2,240.60	293.6	60.8
33	-1	0.50	0.37	0.717	41.163	71.245	2,341.44	300.6	62.
34	-1	0.50	0.36	0.705	42.636	72.852	2,381.40	309.9	63.8
35	0	0.29	0.21	0.703	43.180	73.054	2,386.39	311.8	64.
36	6	0.49	0.36	0.701	45.525	75.563	2,448.03	313.3	64.4
37	7	0.44	0.32	0.694	46.828	76.675	2,474.76	319.0	65.5
38	31	0.47	0.35	0.689	48.101	77.957	2,505.20	322.3	66.
39	2	0.43	0.32	0.687	49.734	79.319	2,537.32	324.3	66.
40	18	0.46	0.34	0.683	51.016	80.527	2,565.52	327.0	66.
41	-11	0.53	0.39	0.677	52.947	82.961	2,621.31	331.7	67.
42	-58	0.22	0.17	0.671	53.373	83.062	2,623.57	336.6	68.
43	-1	0.51	0.38	0.669	56.455	86.643	2,703.68	338.2	68.
44	-5	0.68	0.50	0.660	56.974	87.698	2,726.63	345.3	70.
45	0	0.51	0.38	0.656	60.145	91.401	2,806.41	347.8	70.
46	10	0.50	0.37	0.647	61.443	92.864	2,837.05	355.0	71.
47	13	0.34	0.25	0.649	62.088	93.203	2,844.18	353.5	71.
48	-26	0.34	0.25	0.649	62.088	93.203	2,844.18	353.5	71.
49	0	0.42	0.23	0.638	65.572	96.282	2,907.39	361.9	73.
50	-7	0.45	0.33	0.636	67.920	98.451	2,951.28	363.5	73.
51	15	0.45	0.34	0.633	69.544	99.966	2,981.63	366.1	73.9
52	-6	0.44	0.34	0.626	71.987	102.065	3,022.78	371.3	74.8

Table 1 (continued)

	Angle	Diameter (cm)		Velocity	Acc. length	Acc. Mass	Acc. Energy	Breakup	Q
No.	(deg)	Max.	Min.	(cm/µs)	(cm)	(g)	(KJ)	(μs)	. 14
			2.01	2.010	-1.50-	101.071	0.001.11	077.0	75
53	-6	0.42	0.31	0.618	74.537	104.074	3,061.14	377.6	75.
54	-1	0.42	0.31	0.614	77.726	106.604	3,108.89	380.5	76.
55	3	0.38	0.28	0.610	80.513	108.423	3,142.69	384.2	77.
56	4	0.42	0.31	0.606	81.578	109.256	3,157.96	387.2	77.
57	3	0.38	0.28	0.602	84.490	111.165	3,192.59	389.8	78.
58	-7	0.38	0.28	0.595	86.387	112.399	3,214.44	395.3	79.
59	17	0.35	0.28	0.591	88.042	113.462	3,232.99	398.9	79.
60	51	0.34	0.25	0.587	89.165	114.036	3,242.88	401.8	80.
61	5	0.40	0.30	0.583	92.906	116.754	3,289.05	404.9	80.
62	16	0.45	0.33	0.575	94.247	117.955	3,308.92	410.8	81.
63	-1	0.47	0.35	0.573	95.768	119.450	3,333.42	413.0	82.
64	3	0.43	0.31	0.568	97.667	120.999	3,358.38	416.7	82.
65	0	0.51	0.37	0.561	100.305	124.030	3,406.15	421.6	83.
66	-10	0.50	0.37	0.556	102.216	126.165	3,439.17	425.7	84.
67	-10	0.42	0.31	0.552	103.276	126.993	3,451.78	429.0	84.
68	7	0.41	0.30	0.550	104.515	127.939	3,466.07	430.6	85.
69	8	0.10	0.30	0.546	106.987	129.752	3,493.05	433.9	85.
70	6	0.47	0.31	0.538	108.972	129.752	3,493.05	433.9	85.
71	6	0.41	0.30	0.536	110.726	132.965	3,539.50	441.0	86.
72	-6	0.47	0.34	0.529	112.052	134.253	3,557.54	446.5	87.
73	-20	0.39	0.29	0.527	113.183	135.016	3,568.11	448.6	88.
74	-1	0.47	0.34	0.525	114.689	136.489	3,588.39	450.1	88.
75	6	0.49	0.36	0.522	116.621	138.522	3,616.05	452.5	88.
76	-3	0.40	0.30	0.517	118.164	139.630	3,630.89	455.8	89.
77	-1	0.50	0.37	0.511	122.252	144.137	3,689.80	460.5	90.
78	3	0.44	0.32	0.501	124.719	146.253	3,716.37	468.4	91.
79	-2	0.49	0.36	0.494	127.386	149.029	3,750.30	473.6	92.
80	-7	0.53	0.39	0.489	129.417	151.522	3,780.09	478.0	93.
81	-8	0.46	0.35	0.482	131.712	153.733	3,805.77	483.3	94.
82	-21	0.60	0.44	0.477	133.712	156.895	3,841.77	487.0	97.
83	1	0.49	0.36	0.471	136.606	159.960	3,875.71	492.1	95.
84	1	0.45	0.33	0.467	139.521	162.590	3,904.41	494.8	95.
85	1	0.63	0.46	0.461	141.477	165.972	3,940.37	499.4	96.
86	-35	0.49	0.36	0.457	142.714	167.287	3,954.10	502.8	97.
87	-7	0.59	0.44	0.454	145.185	171.186	3,997.28	505.0	97.
88	-8	0.59	0.43	0.450	146.712	173.529	4,018.06	507.7	98.
89	-18	0.44	0.33	0.446	148.225	174.850	4,031.22	510.8	98.
90	-6	0.59	0.44	0.444	150.465	178.394	4,066.14	512.9	98.
91	-5	0.92	0.68	0.438	154.041	191.917	4,196.05	517.2	99.
92	6	0.20	0.15	0.434	154.673	192.031	4,197.13	520.5	100.
93	2	0.20	0.70	0.434	161.019	217.844	4,433.60	525.2	100.

^{**} Tip velocity is based on earlier times on film A.

Table 1 (continued)

Test Number NHN1-2 Last particle of B is 58 First particle of C is 44 Last particle of C is 93

Coefficient VEL (cm/us) and Position of B (in) where VEL = b0 + b1*x b0 = 1.004 b1 = -0.005

Coefficient VEL (cm/us) and Position of C (in) where VEL = $b0 + b1*x+b2*x^2$ b0 = 0.664 b1 = -0.003 b2 = 0.000 $R^2 = 0.998$

Coefficient Acc Length (cm) and VEL (cm/us) where Acc Length = b0 + b1*VEL+b2*VEL^2 b0 = 456.428 b1 = -857.592 b2 = 388.310 R^2 = 0.998

tbreak =857.592+-776.62 *VEL

Coefficient Acc Mass (gram) and VEL (cm/us) where Acc Mass = b0 + b1*VEL+b2*VEL^2 b0 = 400.110 b1 = -571.148 b2 = 149.635 R^2 = 0.989 d(Acc Mass)/dVEL= 299.27 *VEL+-571.148

Breakup time = 338.85us

Qave = 64.36

X-ray no.	Liner	Explosive	Tip velocity (cm/μs)	$\overline{\mathcal{Q}}$
215	copper	LX-14	0.9	67
216	copper	LX-14	0.903	66
236	copper	Octol 70/30	0.85	60
237	copper	Octol 70/30	0.852	57
239	copper	Octol 70/30	0.858	74
290	copper	Octol 70/30	0.84	64
291	copper	Octol 70/30	0.841	76
292	copper	Octol 70/30	0.849	70
293	copper	TNAZ	0.887	68
312	copper	Octol 70/30	0.427	53
313	copper	Octol 70/30	0.296	54
315	copper	LX-14	0.912	64
316	copper	LX-14	0.894	67
317	copper	LX-14	0.882	70
318	copper	LX-14	0.905	65
319	copper	Octol 70/30	0.851	70
CLX2-18	copper	LX-14	1.027	72
BL1-50.2	copper	LX-19	1.008	76
326	copper	TNAZ 99.1	0.846	74
327	copper	LX-14	0.968	76
328	copper	TNAZ 99.1	0.872	71
329	copper	TNAZ 98.2	0.858	69
453	copper	LX-14	0.861	71
482	copper	LX-14	1.016	65
473	copper	LX-14	0.885	52
450	copper	LX-14	0.874	70
506	copper	LX-14	0.888	69
461	copper	LX-14	0.863	71
NHC-3-2	copper	LX-14	1.065	85
4-903	copper	LX-14	0.864	62
4-904	copper	PAX-12	0.91	73
4-905	copper	LX-14	0.947	67
NHC5-1	copper	PAX-12	1.075	62
5-031	copper	LX-14	0.984	68
4-744	copper	PAX-3	0.861	69
4-746	copper	PAX-3	0.725	64
RT04-079	copper	LX-14	0.696	55
6-566	copper	LX-14	0.872	54
NHN2-1	copper	PBXN-9	1.092	63

average \overline{Q}

66.7

Table 3 Average \overline{Q} values for molybdenum lined devices

X-ray no.	Liner	Explosive	Tip velocity (cm/μs)	Q
M2-T2	molybdenum	PAX-2A	1.162	52
M2A1-16	molybdenum	PAX-2A	1.163	46
MC1-1	molybdenum	LX-14	1.135	58
NHM6-10	molybdenum	LX-14	1.212	42
NHM6-19	molybdenum	LX-14	1.122	40
RT04-077	molybdenum	LX-14	0.705	37
K charge	molybdenum	PBX-N9	1.105	56
			average \overline{Q}	47.3

Table 4 Average \overline{Q} values for tungsten lined devices

X-ray no.	Liner	Explosive	Tip velocity (cm/μs)	$\overline{\mathcal{Q}}$
188	Tungsten	Octol 70/30	0.849	41
238	Tungsten	Octol 70/30	0.933	41
241	Tungsten	Octol 70/30	0.912	41

average \overline{Q} 41

Tables 5 through 7 show the average scaled breakup times for copper, molybdenum, and tungsten, respectively. As expected, the average t_b/D for copper devices is the highest among the three metals presented in this report. The results showed that copper is the most ductile material among the three metals presented here.

Table 5 Average t_b/D values for copper lined devices

X-ray no.	Liner	Explosive	Tip velocity (cm/μs)	t _b , breakup	D, charge diameter	t _b /D
215	Copper	LX-14	0.9	154	81	1.90
216	Copper	LX-14	0.903	150	81	1.85
236	Copper	Octol 70/30	0.85	155	81	1.91
237	Copper	Octol 70/30	0.852	149	81	1.84
239	Copper	Octol 70/30	0.858	184	81	2.27
290	copper	Octol 70/30	0.84	164	81	2.02
291	copper	Octol 70/30	0.841	193	81	2.38
292	copper	Octol 70/30	0.849	165	81	2.04
293	copper	TNAZ	0.887	165	81	2.04
312	copper	Octol 70/30	0:427	271	81	3.35
313	copper	Octol 70/30	0.296	333	81	4.11
315	copper	LX-14	0.912	179	81	2.21
316	copper	LX-14	0.894	180	81	2.22
317	copper	LX-14	0.882	196	81	2.42
318	copper	LX-14	0.905	175	81	2.16
319	copper	Octol 70/30	0.851	184	81	2.27

Table 5 (continued)

X-ray no.	Liner	Explosive	Tip velocity (cm/μs)	tb, breakup	D, charge diameter	tb/D
CLX2-18	copper	LX-14	1.027	235	123	1.81
BL1-50.2	copper	LX-19	1.008	233	123	1.79
326	copper	TNAZ 99.1	0.846	194	81	2.40
327	copper	LX-14	0.968	185	81	2.28
328	copper	TNAZ 99.1	0.872	183	81	2.26
329	copper	TNAZ 98.2	0.858	175	81	2.16
453	copper	LX-14	0.861	178	81	2.20
482	copper	LX-14	1.016	160	81	1.98
473	copper	LX-14	0.885	138	81	1.70
450	copper	LX-14	0.874	170	81	2.10
506	copper	LX-14	0.888	176	81	2.17
461	copper	LX-14	0.863	183	81	2.26
NHC-3-2	copper	LX-14	1.065	235	123	1.91
4-903	copper	LX-14	0.864	162.5	81	2.01
4-904	copper	PAX-12	0.91	195	81	2.41
4-905	copper	LX-14	0.947	174	81	2.15
NHC5-1	copper	PAX-12	1.075	260	146	1.78
5-031	copper	LX-14	0.984	169	81	2.09
4-744	copper	PAX-3	0.861	154	81	1.90
4-746	copper	PAX-3	0.725	159	81	1.96
RT04-079	copper	LX-14	0.696	248	109	2.28
6-566	copper	Ix-14	0.872	121.1	81	1.50
NHN2-1	copper	PBX-N9	1.092	276.1	165	1.67
THE THE	THE RESERVE TO SERVE	THE PERSON NAMED IN		THE STREET	avg t _b /D	2.15

 $\label{eq:tbb} \text{Table 6} \\ \text{Average t_b /D values for molybdenum lined devices} \\$

X-ray no.	Liner	Explosive	Tip Vel (cm/μs)	t _b , breakup time (μs)	D, charge diameter (mm)	tb/D
90	molybdenum	Octol 70/30	1.145	87	73	1.19
95	molybdenum	Octol 70/30	1.165	101	73	1.38
149	molybdenum	Octol 70/30	1.163	107	73	1.47
167	molybdenum	Octol 70/30	1.088	122	73	1.67
172	molybdenum	Octol 70/30	1.183	91	73	1.25
174	molybdenum	Octol 70/30	1.125	117	73	1.60
M2-T2	molybdenum	PAX-2A	1.162	167	123	1.36
M2A1-16	molybdenum	PAX-2A	1.163	142	123	1.15
MC1-1	molybdenum	LX-14	1.135	199	123	1.62
NHM6-10	molybdenum	LX-14	1.212	118	98	1.20
NHM6-19	molybdenum	LX-14	1.122	108	98	1.10
RT04-077	molybdenum	LX-14	0.705	166	109	1.52
K charge	molybdenum	PBX-N9	1.105	223.5	165	1.35

avg t_b/D

Table 7
Average t_b /D values for tungsten lined devices

X-ray no.	Liner	Explosive	Tip velocity (cm/μs)	t _b , breakup time (μs)	D, charge diameter (mm)	t _b /D
188	tungsten	Octol 70/30	0.849	114	81	1.41
238	tungsten	Octol 70/30	0.933	115	81	1.42
241	tungsten	Octol 70/30	0.912	123	81	1.52

ave t_b/D 1.45

ASSUMPTIONS

The density of the particles is assumed to be the same as that of the liner. It also assumes the cross sectional area of a jet particle is circular. The code takes into the virtual origin assumption in which all the jet mass particles are treated as coming from one point in space, each with a different velocity.

COMPARISON TO 2-D HYDROCODE

Figure 11 shows the graphs of the accumulated mass versus velocity of the shaped charge digitization code and the 2-D CALE hydrocode of an 81-mm shaped charge warhead (without wave shaper, bare billet). The accumulated mass from the digitization showed that it matched the hydrocode simulation very well, especially at the tip region up to about 3 km/s.

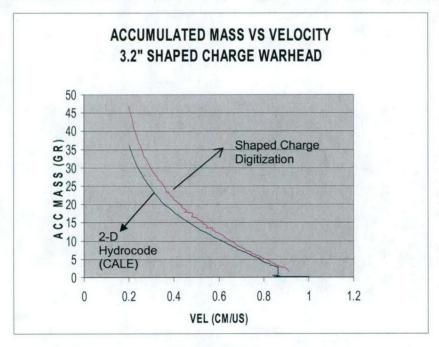


Figure 11
Accumulated mass versus velocity from shaped charge digitization code and 2–D CALE hydrocode

CONCLUSION

Flash radiograph shaped charge digitization program is a necessary tool for jet characterization of warhead performance. Jet parameters are calculated and quantified and subsequently used for penetration predictions. The results from the digitization reduction data is also used to check the results from the continuum modeling and help the optimization of the model during the warhead design of different liner contours, explosives and liner materials.

APPENDIX
OUTPUT FROM PROGRAM NO. 1, INPUT TO PROGRAM NO. 2

AP024624 4875 2 part B = 1 AP0 677111631AP05940811501 AP024712 4982 4 part B = 1 AP0 677111631AP05940811501 AP024712 4982 4 part B = 1 AP0 677111631AP05940811501 AP024812 4983 5 part B = 1 AP0 677111631AP05940811501 AP02482 4874 6 part B = 1 AP0 677111631AP05940811501 AP024792 4823 7 part B = 1 AP0 677111631AP05940811501 AP024792 4823 7 part B = 1 AP0 677111631AP05940811501 AP024730 4752 8 part B = 1 AP0 677111631AP05940811501 AP026009 4822 9 part B = 2 AP0 677111631AP05940811501 AP026109 4888 10 part B = 2 AP0 677111631AP05940811501 AP026143 4857 11 part B = 2 AP0 677111631AP05940811501 AP026143 4857 11 part B = 2 AP0 677111631AP05940811501 AP026193 4684 13 part B = 2 AP0 677111631AP05940811501 AP026194 474114 part B = 2 AP0 677111631AP05940811501 AP026108 4795 15 part B = 2 AP0 677111631AP05940811501 AP026079 4845 16 part B = 2 AP0 677111631AP05940811501 AP026079 4845 16 part B = 2 AP0 677111631AP05940811501 AP026677 4729 18 part B = 3 AP0 677111631AP05940811501 AP026677 4729 19 part B = 3 AP0 677111631AP05940811501 AP026677 4729 19 part B = 3 AP0 677111631AP05940811501 AP026677 4729 19 part B = 3 AP0 677111631AP05940811501 AP026877 4676 20 part B = 3 AP0 677111631AP05940811501 AP026877 4676 20 part B = 3 AP0 677111631AP05940811501 AP026874 4674 22 part B = 3 AP0 677111631AP05940811501 AP026802 4661 23 part B = 3 AP0 677111631AP05940811501 AP026802 4661 23 part B = 3 AP0 677111631AP05940811501 AP026802 4661 23 part B = 3 AP0 677111631AP05940811501 AP026802 4661 23 part B = 3 AP0 677111631AP05940811501 AP026802 4661 23 part B = 4 AP0 677111631AP05940811501 AP026802 4661 23 part B = 4 AP0 677111631AP05940811501 AP026802 4661 23 part B = 5 AP0 6771116	AP024600 4830 1	part B = 1	AP0 677111631AP05940811501
AP024712 4982 4	AP024624 4875 2	part B = 1	AP0 677111631AP05940811501
AP024812 4983 5	AP024652 4951 3	part B = 1	AP0 677111631AP05940811501
AP024825 4874 6	AP024712 4982 4	part B = 1	AP0 677111631AP05940811501
AP024730 4752 8 part B = 1 AP0 677111631AP05940811501 AP024730 4752 8 part B = 1 AP0 677111631AP05940811501 AP026050 4922 9 part B = 2 AP0 677111631AP05940811501 AP026109 4888 10 part B = 2 AP0 677111631AP05940811501 AP026143 4857 11 part B = 2 AP0 677111631AP05940811501 AP026143 4788 12 part B = 2 AP0 677111631AP05940811501 AP026193 4684 13 part B = 2 AP0 677111631AP05940811501 AP026142 4741 14 part B = 2 AP0 677111631AP05940811501 AP026142 4741 15 part B = 2 AP0 677111631AP05940811501 AP026079 4845 16 part B = 2 AP0 677111631AP05940811501 AP026676 4752 17 part B = 3 AP0 677111631AP05940811501 AP026676 4752 17 part B = 3 AP0 677111631AP05940811501 AP026677 4729 18 part B = 3 AP0 677111631AP05940811501 AP026677 4729 18 part B = 3 AP0 677111631AP05940811501 AP026677 4720 19 part B = 3 AP0 677111631AP05940811501 AP026676 4752 19 part B = 3 AP0 677111631AP05940811501 AP026877 4676 20 part B = 3 AP0 677111631AP05940811501 AP026877 4676 20 part B = 3 AP0 677111631AP05940811501 AP026802 4661 23 part B = 3 AP0 677111631AP05940811501 AP026802 4661 23 part B = 3 AP0 677111631AP05940811501 AP026802 4661 23 part B = 3 AP0 677111631AP05940811501 AP026802 4661 23 part B = 3 AP0 677111631AP05940811501 AP026802 4661 23 part B = 3 AP0 677111631AP05940811501 AP026802 4663 25 part B = 4 AP0 677111631AP05940811501 AP028824 2 4663 25 part B = 4 AP0 677111631AP05940811501 AP028856 4773 28 part B = 4 AP0 677111631AP05940811501 AP028856 4773 28 part B = 4 AP0 677111631AP05940811501 AP028856 4793 29 part B = 4 AP0 677111631AP05940811501 AP028856 4793 28 part B = 4 AP0 677111631AP05940811501 AP028856 4793 28 part B = 4 AP0 677111631AP05940811501 AP028856 4793 29 part B = 5 AP0 677111631AP05940811501 AP038856 4793 28 part B = 5 AP0 677111631AP05940811501 AP038856 4793 28 part B = 5 AP0 677111631AP05940811501 AP038856 4793 49 part B = 5 AP0 677111631AP05940811501 AP038458 489 35 part B = 5 AP0 677111631AP05940811501 AP038458 489 35 part B = 5 AP0 677111631AP05940811501 AP034598 4704 44 part B = 6 AP0 677111631AP05940811501 AP034598 4704	AP024812 4983 5	part B = 1	AP0 677111631AP05940811501
AP024792 4823 7 part B = 1 AP0 677111631AP05940811501 AP024730 4752 8 part B = 1 AP0 677111631AP05940811501 AP026050 4922 9 part B = 2 AP0 677111631AP05940811501 AP026109 4888 10 part B = 2 AP0 677111631AP05940811501 AP026183 4887 11 part B = 2 AP0 677111631AP05940811501 AP026187 4789 12 part B = 2 AP0 677111631AP05940811501 AP026187 4789 12 part B = 2 AP0 677111631AP05940811501 AP026183 4684 13 part B = 2 AP0 677111631AP05940811501 AP026183 4684 13 part B = 2 AP0 677111631AP05940811501 AP026184 4795 15 part B = 2 AP0 677111631AP05940811501 AP026079 4845 16 part B = 2 AP0 677111631AP05940811501 AP026079 4845 16 part B = 2 AP0 677111631AP05940811501 AP026676 4752 17 part B = 3 AP0 677111631AP05940811501 AP026797 4722 19 part B = 3 AP0 677111631AP05940811501 AP026797 4722 19 part B = 3 AP0 677111631AP05940811501 AP026874 4676 20 part B = 3 AP0 677111631AP05940811501 AP026874 4640 22 part B = 3 AP0 677111631AP05940811501 AP026844 4640 22 part B = 3 AP0 677111631AP05940811501 AP026844 4640 22 part B = 3 AP0 677111631AP05940811501 AP026842 4661 23 part B = 3 AP0 677111631AP05940811501 AP026842 4661 23 part B = 3 AP0 677111631AP05940811501 AP026842 4661 23 part B = 3 AP0 677111631AP05940811501 AP026864 4740 26 part B = 3 AP0 677111631AP05940811501 AP028856 4773 28 part B = 4 AP0 677111631AP05940811501 AP028856 4773 28 part B = 4 AP0 677111631AP05940811501 AP028856 4795 29 part B = 4 AP0 677111631AP05940811501 AP028856 4795 29 part B = 4 AP0 677111631AP05940811501 AP028864 4559 32 part B = 4 AP0 677111631AP05940811501 AP028856 4795 29 part B = 4 AP0 677111631AP05940811501 AP028856 4773 28 part B = 5 AP0 677111631AP05940811501 AP028856 4795 29 part B = 4 AP0 677111631AP05940811501 AP028856 4795 32 part B = 5 AP0 677111631AP05940811501 AP031328 4565 30 part B = 5 AP0 677111631AP05940811501 AP031328 4565 30 part B = 5 AP0 677111631AP05940811501 AP031328 4565 40 part B = 5 AP0 677111631AP05940811501 AP034388 4494 35 part B = 5 AP0 677111631AP05940811501 AP034598 4704 44 part B = 6 AP0 677111631AP05940811501 AP034598 4704			AP0 677111631AP05940811501
AP024730 4752 8 part B = 1 AP0 677111631AP05940811501 AP026050 4922 9 part B = 2 AP0 677111631AP05940811501 AP026109 4888 10 part B = 2 AP0 677111631AP05940811501 AP026187 4789 12 part B = 2 AP0 677111631AP05940811501 AP026187 4789 12 part B = 2 AP0 677111631AP05940811501 AP026187 4789 12 part B = 2 AP0 677111631AP05940811501 AP026189 4684 13 part B = 2 AP0 677111631AP05940811501 AP026184 4795 15 part B = 2 AP0 677111631AP05940811501 AP026184 4795 15 part B = 2 AP0 677111631AP05940811501 AP026079 4845 16 part B = 2 AP0 677111631AP05940811501 AP026079 4722 19 part B = 3 AP0 677111631AP05940811501 AP026797 4722 19 part B = 3 AP0 677111631AP05940811501 AP026972 4722 19 part B = 3 AP0 677111631AP05940811501 AP026972 4641 21 part B = 3 AP0 677111631AP05940811501 AP026972 4641 21 part B = 3 AP0 677111631AP05940811501 AP026912 4641 21 part B = 3 AP0 677111631AP05940811501 AP026912 4641 22 part B = 3 AP0 677111631AP05940811501 AP026844 4640 22 part B = 3 AP0 677111631AP05940811501 AP026874 4740 26 part B = 3 AP0 677111631AP05940811501 AP028714 4739 27 part B = 4 AP0 677111631AP05940811501 AP0288714 4739 27 part B = 4 AP0 677111631AP05940811501 AP0288714 4739 27 part B = 4 AP0 677111631AP05940811501 AP028874 4730 26 part B = 4 AP0 677111631AP05940811501 AP028874 4730 26 part B = 4 AP0 677111631AP05940811501 AP028874 4730 28 part B = 4 AP0 677111631AP05940811501 AP028874 4730 28 part B = 4 AP0 677111631AP05940811501 AP028874 4730 28 part B = 4 AP0 677111631AP05940811501 AP028874 4730 28 part B = 4 AP0 677111631AP05940811501 AP028940 45450 39 part B = 4 AP0 677111631AP05940811501 AP028940 45450 39 part B = 5 AP0 677111631AP05940811501 AP028940 45450 39 part B = 5 AP0 677111631AP05940811501 AP03835 4849 35 part B = 5 AP0 677111631AP05940811501 AP03835 4849 35 part B = 5 AP0 677111631AP05940811501 AP031328 4565 40 part B = 5 AP0 677111631AP05940811501 AP031328 4565 40 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP034409 4516 42 part B = 6 AP0 677111631AP05940811501 AP034353 4	AP024792 4823 7		AP0 677111631AP05940811501
AP026050 4922 9			
AP026109 4888 10 AP026143 4857 11 AP026187 4789 12 AP0 677111631AP05940811501 AP026187 4789 12 AP0 677111631AP05940811501 AP026193 4684 13 AP026193 4684 13 AP026142 4741 14 AP026193 4684 15 AP026079 4845 16 AP02677117631AP05940811501 AP026676 4752 17 AP026757 4729 18 AP0 677111631AP05940811501 AP026777 4729 19 AP0 677111631AP05940811501 AP026877 4729 19 AP0 677111631AP05940811501 AP026877 4767 620 AP0 677111631AP05940811501 AP026877 4676 20 AP0 677111631AP05940811501 AP026802 4661 23 AP0 677111631AP05940811501 AP026802 4661 23 AP0 677111631AP05940811501 AP026802 4661 23 AP0 677111631AP05940811501 AP028842 4663 25 AP1 B = 3 AP0 677111631AP05940811501 AP028874 4740 26 AP0 87711631AP05940811501 AP028874 4739 27 AP1 B = 4 AP0 677111631AP05940811501 AP028874 4739 27 AP1 B = 4 AP0 677111631AP05940811501 AP028874 4739 27 AP1 B = 4 AP0 677111631AP05940811501 AP028874 4739 27 AP1 B = 4 AP0 677111631AP05940811501 AP028874 4739 27 AP1 B = 4 AP0 677111631AP05940811501 AP028874 4739 27 AP1 B = 4 AP0 677111631AP05940811501 AP028874 4739 27 AP1 B = 4 AP0 677111631AP05940811501 AP028874 4739 27 AP1 B = 4 AP0 677111631AP05940811501 AP028874 4613 31 AP1 B = 4 AP0 677111631AP05940811501 AP0288942 4681 30 AP028942 4681 30 AP1 B = 5 AP0 677111631AP05940811501 AP0288942 4681 30 AP1 B = 5 AP0 677111631AP05940811501 AP0288942 4681 30 AP1 B = 5 AP0 677111631AP05940811501 AP0288942 4681 30 AP0 B = 6 AP0 677111631AP05940811501 AP0289408 4684 479 AP0 677111631AP05940811501 AP02889408 4684 479 AP0 677111631AP05940811501 AP02889408 4684 479 AP0 677111631AP05940811501 AP02889408 4684 479 AP0 677111631AP05940811501 AP031353 4623 33 AP1 B = 5 AP0 677111631AP05940811501 AP034894 4684 479 AP0 677111631AP05940811501 AP034894 4684 4694 AP0 677111631AP05940811501 AP034409 4516 42 AP0 677111631AP05940811501 AP034598 489 35 AP0 677111631AP05940811501 AP034598 489 489 AP0 677111631AP05940	AP026050 4922 9		AP0 677111631AP05940811501
AP026187 4789 12 part B = 2 AP0 677111631AP05940811501 AP026193 4684 13 part B = 2 AP0 677111631AP05940811501 AP026108 4795 15 part B = 2 AP0 677111631AP05940811501 AP026108 4795 15 part B = 2 AP0 677111631AP05940811501 AP026079 4845 16 part B = 2 AP0 677111631AP05940811501 AP026676 4752 17 part B = 3 AP0 677111631AP05940811501 AP026676 4752 17 part B = 3 AP0 677111631AP05940811501 AP026797 4722 19 part B = 3 AP0 677111631AP05940811501 AP026677 4722 19 part B = 3 AP0 677111631AP05940811501 AP026697 4722 19 part B = 3 AP0 677111631AP05940811501 AP026877 4676 20 part B = 3 AP0 677111631AP05940811501 AP026844 4640 22 part B = 3 AP0 677111631AP05940811501 AP026802 4661 23 part B = 3 AP0 677111631AP05940811501 AP026802 4661 23 part B = 3 AP0 677111631AP05940811501 AP026802 4661 23 part B = 3 AP0 677111631AP05940811501 AP028422 4663 25 part B = 4 AP0 677111631AP05940811501 AP028874 4739 27 part B = 4 AP0 677111631AP05940811501 AP028874 4739 27 part B = 4 AP0 677111631AP05940811501 AP028874 4739 27 part B = 4 AP0 677111631AP05940811501 AP028894 4681 30 part B = 4 AP0 677111631AP05940811501 AP028894 4681 30 part B = 4 AP0 677111631AP05940811501 AP028894 4681 30 part B = 4 AP0 677111631AP05940811501 AP028842 4681 30 part B = 4 AP0 677111631AP05940811501 AP028842 4681 30 part B = 4 AP0 677111631AP05940811501 AP028842 4681 30 part B = 5 AP0 677111631AP05940811501 AP038942 4681 30 part B = 5 AP0 677111631AP05940811501 AP038942 4681 30 part B = 5 AP0 677111631AP05940811501 AP0381551 4809 36 part B = 5 AP0 677111631AP05940811501 AP031680 4724 37 part B = 5 AP0 677111631AP05940811501 AP031680 4724 37 part B = 5 AP0 677111631AP05940811501 AP031680 4724 37 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP034409 4516 42 part B = 6 AP0 677111631AP05940811501 AP034409 4516 42 part B = 6 AP0 677111631AP05940811501 AP0344553 4652 43 part B = 6 AP0 677111631AP05940811501 AP0344553			AP0 677111631AP05940811501
AP026187 4789 12 part B = 2 AP0 677111631AP05940811501 AP026108 4684 13 part B = 2 AP0 677111631AP05940811501 AP026108 4795 15 part B = 2 AP0 677111631AP05940811501 AP026108 4795 15 part B = 2 AP0 677111631AP05940811501 AP026079 4845 16 part B = 2 AP0 677111631AP05940811501 AP026676 4752 17 part B = 3 AP0 677111631AP05940811501 AP026676 4752 17 part B = 3 AP0 677111631AP05940811501 AP026797 4722 19 part B = 3 AP0 677111631AP05940811501 AP026677 4722 19 part B = 3 AP0 677111631AP05940811501 AP026677 4722 19 part B = 3 AP0 677111631AP05940811501 AP026877 4676 20 part B = 3 AP0 677111631AP05940811501 AP026844 4640 22 part B = 3 AP0 677111631AP05940811501 AP026802 4661 23 part B = 3 AP0 677111631AP05940811501 AP026802 4661 23 part B = 3 AP0 677111631AP05940811501 AP026802 4661 23 part B = 3 AP0 677111631AP05940811501 AP028422 4663 25 part B = 4 AP0 677111631AP05940811501 AP028714 4739 27 part B = 4 AP0 677111631AP05940811501 AP028874 4739 27 part B = 4 AP0 677111631AP05940811501 AP028856 4773 28 part B = 4 AP0 677111631AP05940811501 AP028894 4681 30 part B = 4 AP0 677111631AP05940811501 AP028894 4681 30 part B = 4 AP0 677111631AP05940811501 AP028894 4681 30 part B = 4 AP0 677111631AP05940811501 AP028842 4681 30 part B = 4 AP0 677111631AP05940811501 AP028842 4681 30 part B = 5 AP0 677111631AP05940811501 AP028842 4681 30 part B = 5 AP0 677111631AP05940811501 AP038942 4681 30 part B = 5 AP0 677111631AP05940811501 AP038942 4681 30 part B = 5 AP0 677111631AP05940811501 AP038454 423 7 part B = 5 AP0 677111631AP05940811501 AP031680 4724 37 part B = 5 AP0 677111631AP05940811501 AP031680 4724 37 part B = 5 AP0 677111631AP05940811501 AP031680 4724 37 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP034409 4516 42 part B = 6 AP0 677111631AP05940811501 AP034409 4516 42 part B = 6 AP0 677111631AP05940811501 AP0348346 4171 41 part B = 6 AP0 677111631AP05940811501 AP034483 467	AP026143 4857 11	part B = 2	AP0 677111631AP05940811501
AP026142 4741 14 AP026108 4795 15 AP026108 4795 15 AP026079 4845 16 AP026079 4845 16 AP026676 4752 17 AP026757 4729 18 AP026757 4729 18 AP026757 4729 19 AP026877 4676 20 AP026877 4676 20 AP026877 4676 20 AP026802 4641 21 AP026802 4641 21 AP026802 4661 23 AP0 677111631AP05940811501 AP0226802 4666 23 AP0 677111631AP05940811501 AP0226802 4666 23 AP0 677111631AP05940811501 AP022874 4740 26 AP02874 4739 27 AP0 4731 28 AP0 677111631AP05940811501 AP028714 4739 27 AP0 4731 28 AP0 677111631AP05940811501 AP028824 4613 31 AP0 677111631AP05940811501 AP038824 4613 31 AP0 677111631AP05940811501 AP038824 4613 31 AP0 677111631AP05940811501 AP03153 4623 33 AP0 677111631AP05940811501 AP03163 4560 38 AP0 677111631AP05940811501 AP034346 4171 41 AP03 4562 43 AP0 677111631AP05940811501 AP034346 4171 41 AP03 4562 43 AP0 677111631AP05940811501 AP0343404 4516 42 AP0 677111631AP05940811501 AP034598 4704 44 AP0 677111631AP0594	AP026187 4789 12	· ·	AP0 677111631AP05940811501
AP026108 4795 15 AP026079 4845 16 AP026079 4845 16 AP026676 4752 17 AP026676 4752 17 AP026676 4752 17 AP026676 4752 17 AP026676 4752 18 AP0 677111631AP05940811501 AP026757 4729 18 AP0 677111631AP05940811501 AP026797 4722 19 AP0 677111631AP05940811501 AP026877 4676 20 AP0 677111631AP05940811501 AP026817 4671 21 AP026812 4641 21 AP0 677111631AP05940811501 AP026802 4661 23 AP0 677111631AP05940811501 AP026802 4661 23 AP0 677111631AP05940811501 AP026802 4661 23 AP0 677111631AP05940811501 AP026817 4703 24 AP0 677111631AP05940811501 AP028574 4740 26 AP0 677111631AP05940811501 AP028574 4740 26 AP0 47711631AP05940811501 AP028856 4773 28 AP0 677111631AP05940811501 AP028856 4773 28 AP0 677111631AP05940811501 AP028856 4773 28 AP0 677111631AP05940811501 AP028824 4681 30 AP0 677111631AP05940811501 AP028826 4559 32 AP0 677111631AP05940811501 AP03153 4623 33 AP0 677111631AP05940811501 AP03153 4623 33 AP0 677111631AP05940811501 AP031526 4751 34 AP0 677111631AP05940811501 AP031226 4751 34 AP0 677111631AP05940811501 AP031226 4751 34 AP0 677111631AP05940811501 AP03123 4849 35 AP0 677111631AP05940811501 AP031328 4859 30 AP0 677111631AP05940811501 AP031476 4508 39 AP0 677111631AP05940811501 AP031476 4508 39 AP0 677111631AP05940811501 AP031476 4508 39 AP0 677111631AP05940811501 AP034346 4171 41 AP0 88645 4559 40 AP0 677111631AP05940811501 AP034346 4171 41 AP0 88645 4559 40 AP0 677111631AP05940811501 AP034346 4171 41 AP03 8864 497 46 AP0 677111631AP05940811501 AP034598 4704 44 AP0 677111631AP05940811501 AP034598 4704	AP026193 4684 13	part B = 2	AP0 677111631AP05940811501
AP026079 4845 16 AP026676 4752 17 AP0226757 4729 18 AP026757 4729 18 AP026777 4729 18 AP026877 4722 19 AP026877 4676 20 AP026877 4676 20 AP026874 4676 20 AP026812 4641 21 AP026812 4641 21 AP026844 4640 22 AP0 877111631AP05940811501 AP026844 4640 22 AP0 877111631AP05940811501 AP026844 4640 22 AP0 877111631AP05940811501 AP026812 4661 23 AP0 877111631AP05940811501 AP028422 4663 25 AP0 877111631AP05940811501 AP028424 4663 25 AP0 877111631AP05940811501 AP028574 4740 26 AP028574 4740 26 AP028574 4740 26 AP028574 4740 27 AP028574 4740 29 AP0 877111631AP05940811501 AP028574 4740 29 AP0 877111631AP05940811501 AP028574 4740 29 AP0 877111631AP05940811501 AP028574 4740 30 AP028574 4740 30 AP028574 4740 30 AP0 877111631AP05940811501 AP028854 4773 28 AP0 677111631AP05940811501 AP028854 4631 30 AP0 877111631AP05940811501 AP028942 4681 30 AP0 877111631AP05940811501 AP038942 4681 30 AP0 877111631AP05940811501 AP031153 4623 33 AP0 677111631AP05940811501 AP031226 4751 34 AP0 677111631AP05940811501 AP031226 4751 34 AP0 877111631AP05940811501 AP031254 4751 34 AP0 877111631AP05940811501 AP031264 4751 34 AP0 877111631AP05940811501 AP031464 4508 39 AP0 877111631AP05940811501 AP031464 4508 39 AP0 877111631AP05940811501 AP031464 4508 39 AP0 877111631AP05940811501 AP034346 4171 41 AP0 8864 447 46 AP0 677111631AP05940811501 AP034584 4764 4508 39 AP0 877111631AP05940811501 AP034584 4704 44 AP0 677111631AP05940811501 AP034584 4764 4508 39 AP0 877111631AP05940811501 AP034584 4784 4508 4508 4508 4508 4508 4508	AP026142 4741 14	part B = 2	AP0 677111631AP05940811501
AP026766 4752 17 AP026757 4729 18 AP026757 4729 18 AP026757 4722 19 AP026757 4722 19 AP026757 4722 19 AP026877 4676 20 AP026877 4676 20 AP026812 4641 21 AP026812 4641 21 AP026824 4640 22 AP0 877111631AP05940811501 AP026824 4640 22 AP026802 4661 23 AP0 677111631AP05940811501 AP026802 4661 23 AP0 677111631AP05940811501 AP026814 4740 26 AP026717 4703 24 AP028714 4739 27 AP02874 4740 26 AP02874 4740 26 AP028856 4773 28 AP0 677111631AP05940811501 AP028856 4773 28 AP0 677111631AP05940811501 AP028856 4773 28 AP0 677111631AP05940811501 AP028824 4681 30 AP0 677111631AP05940811501 AP028824 4681 31 AP0 677111631AP05940811501 AP028824 4688 39 AP0 677111631AP05940811501 AP03153 4623 33 AP0 677111631AP05940811501 AP031551 4809 36 AP0 877111631AP05940811501 AP031551 4809 36 AP0 877111631AP05940811501 AP031551 4809 36 AP0 877111631AP05940811501 AP03153 4624 37 AP0 88 5 AP0 677111631AP05940811501 AP031580 4724 37 AP0 88 5 AP0 677111631AP05940811501 AP031580 4724 37 AP0 88 5 AP0 677111631AP05940811501 AP031680 4724 37 AP0 88 5 AP0 677111631AP05940811501 AP031580 4724 37 AP0 88 5 AP0 677111631AP05940811501 AP031580 4724 37 AP0 88 5 AP0 677111631AP05940811501 AP031581 4809 36 AP0 877111631AP05940811501 AP031680 4724 37 AP0 88 5 AP0 677111631AP05940811501 AP031680 4724 37 AP0 88 6 AP0 677111631AP05940811501 AP031680 4724 37 AP0 88 6 AP0 677111631AP05940811501 AP034594 476 4508 39 AP0 877111631AP05940811501 AP034594 476 4508 39 AP0 877111631AP05940811501 AP034598 4704 44	AP026108 4795 15	The state of the s	AP0 677111631AP05940811501
AP026757 4729 18 AP026797 4722 19 AP026877 4676 20 AP026874 4676 20 AP0268012 4641 21 AP026802 4661 23 AP0 677111631AP05940811501 AP026802 4661 23 AP0 677111631AP05940811501 AP026717 4703 24 AP026717 4703 24 AP026717 4703 24 AP026717 4703 24 AP028714 4739 27 AP02856 4773 28 AP0 677111631AP05940811501 AP028574 4740 26 AP02876 4795 29 AP0 877111631AP05940811501 AP028856 4773 28 AP0 677111631AP05940811501 AP028856 4773 28 AP0 677111631AP05940811501 AP028856 4773 28 AP0 677111631AP05940811501 AP028824 4681 30 AP0 877111631AP05940811501 AP038942 4681 30 AP0 877111631AP05940811501 AP038804 724 37 AP0 877111631AP05940811501 AP031395 4849 35 AP0 877111631AP05940811501 AP031496 4508 39 AP0 877111631AP05940811501 AP034304 4516 42 AP0 877111631AP05940811501 AP034304 4516 42 AP0 877111631AP05940811501 AP034304 4516 42 AP0 877111631AP05940811501 AP034308 4704 44 AP0 677111631AP05940811501 AP034308 4704 44 AP0 677111631AP05940811501 AP034889 4704 44 AP0 677111631AP0	AP026079 4845 16	part B = 2	AP0 677111631AP05940811501
AP026777 4722 19	AP026676 4752 17	part B = 3	AP0 677111631AP05940811501
AP026877 4676 20 part B = 3 AP0 677111631AP05940811501 AP026912 4641 21 part B = 3 AP0 677111631AP05940811501 AP026802 4661 23 part B = 3 AP0 677111631AP05940811501 AP026802 4661 23 part B = 3 AP0 677111631AP05940811501 AP026717 4703 24 part B = 3 AP0 677111631AP05940811501 AP028422 4663 25 part B = 4 AP0 677111631AP05940811501 AP02874 4739 27 part B = 4 AP0 677111631AP05940811501 AP02874 4739 27 part B = 4 AP0 677111631AP05940811501 AP02874 4739 27 part B = 4 AP0 677111631AP05940811501 AP028856 4773 28 part B = 4 AP0 677111631AP05940811501 AP028056 4795 29 part B = 4 AP0 677111631AP05940811501 AP028942 4681 30 part B = 4 AP0 677111631AP05940811501 AP028824 4613 31 part B = 4 AP0 677111631AP05940811501 AP028645 4559 32 part B = 4 AP0 677111631AP05940811501 AP031153 4623 33 part B = 5 AP0 677111631AP05940811501 AP03126 4751 34 part B = 5 AP0 677111631AP05940811501 AP031395 4849 35 part B = 5 AP0 677111631AP05940811501 AP031395 4849 35 part B = 5 AP0 677111631AP05940811501 AP031395 4849 35 part B = 5 AP0 677111631AP05940811501 AP031395 4859 36 part B = 5 AP0 677111631AP05940811501 AP031395 4869 37 part B = 5 AP0 677111631AP05940811501 AP031395 4869 38 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 6 AP0 677111631AP05940811501 AP034409 4516 42 part B = 6 AP0 677111631AP05940811501 AP034598 4704 44 part B = 6 AP0 677111631AP05940811501 AP034598 4704 44 part B = 6 AP0 677111631AP05940811501 AP034598 4704 44 part B = 6 AP0 677111631AP05940811501 AP034859 4285 47 part B = 6 AP0 677111631AP05940811501 AP034859 4285 47 part B = 6 AP0 677111631AP05940811501 AP034859 4285 47 part B = 6 AP0 677111631AP05940811501 AP034553 4039 48 part B = 6 AP0 677111631AP05940811501	AP026757 4729 18	part B = 3	AP0 677111631AP05940811501
AP026912 4641 21	AP026797 4722 19	part B = 3	AP0 677111631AP05940811501
AP026844 4640 22 part B = 3 AP0 677111631AP05940811501 AP026802 4661 23 part B = 3 AP0 677111631AP05940811501 AP026717 4703 24 part B = 3 AP0 677111631AP05940811501 AP028422 4663 25 part B = 4 AP0 677111631AP05940811501 AP02874 4740 26 part B = 4 AP0 677111631AP05940811501 AP028714 4739 27 part B = 4 AP0 677111631AP05940811501 AP028856 4773 28 part B = 4 AP0 677111631AP05940811501 AP028942 4681 30 part B = 4 AP0 677111631AP05940811501 AP028942 4681 30 part B = 4 AP0 677111631AP05940811501 AP028942 4613 31 part B = 4 AP0 677111631AP05940811501 AP028645 4559 32 part B = 4 AP0 677111631AP05940811501 AP031153 4623 33 part B = 5 AP0 677111631AP05940811501 AP031153 4623 33 part B = 5 AP0 677111631AP05940811501 AP031395 4849 35 part B = 5 AP0 677111631AP05940811501 AP031395 4849 35 part B = 5 AP0 677111631AP05940811501 AP031395 4849 35 part B = 5 AP0 677111631AP05940811501 AP031680 4724 37 part B = 5 AP0 677111631AP05940811501 AP031680 4724 37 part B = 5 AP0 677111631AP05940811501 AP031680 4724 37 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP034364 4171 41 part B = 6 AP0 677111631AP05940811501 AP034409 4516 42 part B = 6 AP0 677111631AP05940811501 AP034409 4516 42 part B = 6 AP0 677111631AP05940811501 AP034409 4516 42 part B = 6 AP0 677111631AP05940811501 AP034409 4516 42 part B = 6 AP0 677111631AP05940811501 AP034838 4704 44 part B = 6 AP0 677111631AP05940811501 AP034886 4497 46 part B = 6 AP0 677111631AP05940811501 AP034886 4497 46 part B = 6 AP0 677111631AP05940811501 AP034886 4497 46 part B = 6 AP0 677111631AP05940811501 AP034886 4497 46 part B = 6 AP0 677111631AP05940811501 AP034885 4285 47 part B = 6 AP0 677111631AP05940811501 AP034885 4285 47 part B = 6 AP0 677111631AP05940811501 AP034885 4285 47 part B = 6 AP0 677111631AP05940811501	AP026877 4676 20	part B = 3	AP0 677111631AP05940811501
AP026802 4661 23 AP026717 4703 24 AP026717 4703 24 AP028472 4663 25 AP028574 4740 26 AP028574 4740 26 AP028714 4739 27 AP028714 4739 27 AP028713 28 AP0 677111631AP05940811501 AP028956 4795 29 AP0 677111631AP05940811501 AP028942 4681 30 AP028942 4681 30 AP028844 4613 31 AP028645 4559 32 AP0 677111631AP05940811501 AP021864 4613 31 AP028645 4559 32 AP0 677111631AP05940811501 AP031153 4623 33 AP0 677111631AP05940811501 AP031153 4623 33 AP0 677111631AP05940811501 AP031395 4849 35 AP0 677111631AP05940811501 AP031476 4508 39 AP0 877111631AP05940811501 AP031476 4508 39 AP0 877111631AP05940811501 AP031476 4508 39 AP0 877111631AP05940811501 AP034346 4171 41 AP0 8 8 AP0 677111631AP05940811501 AP034346 4171 41 AP0 8 AP0 677111631AP05940811501 AP034346 4171 41 AP0 8 AP0 677111631AP05940811501 AP034834 4652 43 AP0 8 AP0 677111631AP05940811501 AP034836 4497 46 AP0 677111631AP05940811501 AP034886 4497 46 AP0 677111631AP05940811501 AP034859 4285 47 AP0 677111631AP05940811501	AP026912 4641 21	part B = 3	AP0 677111631AP05940811501
AP026717 4703 24	AP026844 4640 22	part B = 3	AP0 677111631AP05940811501
AP028422 4663 25	AP026802 4661 23	part B = 3	AP0 677111631AP05940811501
AP028574 4740 26	AP026717 4703 24	part B = 3	AP0 677111631AP05940811501
AP028714 4739 27 AP028856 4773 28 AP0677111631AP05940811501 AP029056 4795 29 AP028942 4681 30 AP028824 4613 31 AP028645 4559 32 AP0677111631AP05940811501 AP031153 4623 33 AP031226 4751 34 AP031153 4623 33 AP031256 4751 34 AP031551 4809 36 AP031680 4724 37 AP031623 4560 38 AP0677111631AP05940811501 AP031476 4508 39 AP031476 4508 39 AP0677111631AP05940811501 AP034366 4171 41 AP034537 4652 43 AP0677111631AP05940811501 AP034537 4652 43 AP0677111631AP05940811501 AP034537 4652 43 AP0677111631AP05940811501 AP034886 4497 46 AP0677111631AP05940811501 AP034859 4285 47 AP0677111631AP05940811501 AP034859 4285 47 AP0677111631AP05940811501 AP034553 4039 48 AP0677111631AP05940811501 AP0677111631AP05940811501 AP077111631AP05940811501 AP0777111631AP05940811501 AP077111631AP05940811501 AP0777111631AP05940811501 AP077111631AP05940811501 AP077111631AP05940811501 AP0777111631AP05940811501 AP0777111631AP05940811501 AP0777111631AP05940811501 AP0777111631AP05940811501 AP0777111631AP05940811501 AP0777111631AP05940811501 AP077711631AP05940811501	AP028422 4663 25	part B = 4	AP0 677111631AP05940811501
AP028856 4773 28	AP028574 4740 26	part B = 4	AP0 677111631AP05940811501
AP029056 4795 29	AP028714 4739 27	part B = 4	AP0 677111631AP05940811501
AP028942 4681 30	AP028856 4773 28	part B = 4	AP0 677111631AP05940811501
AP028824 4613 31	AP029056 4795 29	part B = 4	AP0 677111631AP05940811501
AP028645 4559 32 part B = 4 AP0 677111631AP05940811501 AP031153 4623 33 part B = 5 AP0 677111631AP05940811501 AP031226 4751 34 part B = 5 AP0 677111631AP05940811501 AP031395 4849 35 part B = 5 AP0 677111631AP05940811501 AP031551 4809 36 part B = 5 AP0 677111631AP05940811501 AP031680 4724 37 part B = 5 AP0 677111631AP05940811501 AP031623 4560 38 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP031328 4565 40 part B = 5 AP0 677111631AP05940811501 AP034346 4171 41 part B = 6 AP0 677111631AP05940811501 AP034409 4516 42 part B = 6 AP0 677111631AP05940811501 AP034537 4652 43 part B = 6 AP0 677111631AP05940811501 AP034537 4652 43 part B = 6 AP0 677111631AP05940811501 AP034538 4704 44 part B = 6 AP0 677111631AP05940811501 AP034833 4675 45 part B = 6 AP0 677111631AP05940811501 AP034886 4497 46 part B = 6 AP0 677111631AP05940811501 AP034859 4285 47 part B = 6 AP0 677111631AP05940811501 AP034859 4285 47 part B = 6 AP0 677111631AP05940811501 AP034859 4285 47 part B = 6 AP0 677111631AP05940811501 AP034553 4039 48 AP0 677111631AP05940811501	AP028942 4681 30	part B = 4	AP0 677111631AP05940811501
AP031153 4623 33	AP028824 4613 31	part B = 4	AP0 677111631AP05940811501
AP031226 4751 34 part B = 5 AP0 677111631AP05940811501 AP031395 4849 35 part B = 5 AP0 677111631AP05940811501 AP031551 4809 36 part B = 5 AP0 677111631AP05940811501 AP031680 4724 37 part B = 5 AP0 677111631AP05940811501 AP031623 4560 38 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP031328 4565 40 part B = 5 AP0 677111631AP05940811501 AP034346 4171 41 part B = 6 AP0 677111631AP05940811501 AP034409 4516 42 part B = 6 AP0 677111631AP05940811501 AP034537 4652 43 part B = 6 AP0 677111631AP05940811501 AP034598 4704 44 part B = 6 AP0 677111631AP05940811501 AP034598 4704 44 part B = 6 AP0 677111631AP05940811501 AP034833 4675 45 part B = 6 AP0 677111631AP05940811501 AP034886 4497 46 part B = 6 AP0 677111631AP05940811501 AP034859 4285 47 part B = 6 AP0 677111631AP05940811501 AP034553 4039 48 part B = 6 AP0 677111631AP05940811501 AP034553 4039 48 part B = 6 AP0 677111631AP05940811501	AP028645 4559 32	part B = 4	AP0 677111631AP05940811501
AP031395 4849 35 part B = 5 AP0 677111631AP05940811501 AP031551 4809 36 part B = 5 AP0 677111631AP05940811501 AP031680 4724 37 part B = 5 AP0 677111631AP05940811501 AP031623 4560 38 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP031328 4565 40 part B = 5 AP0 677111631AP05940811501 AP034346 4171 41 part B = 6 AP0 677111631AP05940811501 AP034409 4516 42 part B = 6 AP0 677111631AP05940811501 AP034537 4652 43 part B = 6 AP0 677111631AP05940811501 AP034598 4704 44 part B = 6 AP0 677111631AP05940811501 AP034833 4675 45 part B = 6 AP0 677111631AP05940811501 AP034886 4497 46 part B = 6 AP0 677111631AP05940811501 AP034859 4285 47 part B = 6 AP0 677111631AP05940811501 AP034553 4039 48 part B = 6 AP0 677111631AP05940811501 AP034553 4039 48 part B = 6 AP0 677111631AP05940811501	AP031153 4623 33	part B = 5	AP0 677111631AP05940811501
AP031551 4809 36	AP031226 4751 34		AP0 677111631AP05940811501
AP031680 4724 37 part B = 5 AP0 677111631AP05940811501 AP031623 4560 38 part B = 5 AP0 677111631AP05940811501 AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP031328 4565 40 part B = 5 AP0 677111631AP05940811501 AP034346 4171 41 part B = 6 AP0 677111631AP05940811501 AP034409 4516 42 part B = 6 AP0 677111631AP05940811501 AP034537 4652 43 part B = 6 AP0 677111631AP05940811501 AP034598 4704 44 part B = 6 AP0 677111631AP05940811501 AP034833 4675 45 part B = 6 AP0 677111631AP05940811501 AP034886 4497 46 part B = 6 AP0 677111631AP05940811501 AP034859 4285 47 part B = 6 AP0 677111631AP05940811501 AP034553 4039 48 part B = 6 AP0 677111631AP05940811501 AP034553 4039 48 part B = 6 AP0 677111631AP05940811501	AP031395 4849 35	part B = 5	AP0 677111631AP05940811501
AP031623 4560 38	AP031551 4809 36	part B = 5	AP0 677111631AP05940811501
AP031476 4508 39 part B = 5 AP0 677111631AP05940811501 AP031328 4565 40 part B = 5 AP0 677111631AP05940811501 AP034346 4171 41 part B = 6 AP0 677111631AP05940811501 AP034409 4516 42 part B = 6 AP0 677111631AP05940811501 AP034537 4652 43 part B = 6 AP0 677111631AP05940811501 AP034598 4704 44 part B = 6 AP0 677111631AP05940811501 AP034833 4675 45 part B = 6 AP0 677111631AP05940811501 AP034886 4497 46 part B = 6 AP0 677111631AP05940811501 AP034859 4285 47 part B = 6 AP0 677111631AP05940811501 AP034553 4039 48 part B = 6 AP0 677111631AP05940811501	AP031680 4724 37	part B = 5	AP0 677111631AP05940811501
AP031328 4565 40 part B = 5 AP0 677111631AP05940811501 AP034346 4171 41 part B = 6 AP0 677111631AP05940811501 AP034409 4516 42 part B = 6 AP0 677111631AP05940811501 AP034537 4652 43 part B = 6 AP0 677111631AP05940811501 AP034598 4704 44 part B = 6 AP0 677111631AP05940811501 AP034833 4675 45 part B = 6 AP0 677111631AP05940811501 AP034886 4497 46 part B = 6 AP0 677111631AP05940811501 AP034859 4285 47 part B = 6 AP0 677111631AP05940811501 AP034553 4039 48 part B = 6 AP0 677111631AP05940811501	AP031623 4560 38	part B = 5	AP0 677111631AP05940811501
AP034346 4171 41 part B = 6 AP0 677111631AP05940811501 AP034409 4516 42 part B = 6 AP0 677111631AP05940811501 AP034537 4652 43 part B = 6 AP0 677111631AP05940811501 AP034598 4704 44 part B = 6 AP0 677111631AP05940811501 AP034833 4675 45 part B = 6 AP0 677111631AP05940811501 AP034886 4497 46 part B = 6 AP0 677111631AP05940811501 AP034859 4285 47 part B = 6 AP0 677111631AP05940811501 AP034553 4039 48 part B = 6 AP0 677111631AP05940811501	AP031476 4508 39	part B = 5	AP0 677111631AP05940811501
AP034409 4516 42 part B = 6 AP0 677111631AP05940811501 AP034537 4652 43 part B = 6 AP0 677111631AP05940811501 AP034598 4704 44 part B = 6 AP0 677111631AP05940811501 AP034833 4675 45 part B = 6 AP0 677111631AP05940811501 AP034886 4497 46 part B = 6 AP0 677111631AP05940811501 AP034859 4285 47 part B = 6 AP0 677111631AP05940811501 AP034553 4039 48 part B = 6 AP0 677111631AP05940811501	AP031328 4565 40	part B = 5	AP0 677111631AP05940811501
AP034537 4652 43 part B = 6 AP0 677111631AP05940811501 AP034598 4704 44 part B = 6 AP0 677111631AP05940811501 AP034833 4675 45 part B = 6 AP0 677111631AP05940811501 AP034886 4497 46 part B = 6 AP0 677111631AP05940811501 AP034859 4285 47 part B = 6 AP0 677111631AP05940811501 AP034553 4039 48 part B = 6 AP0 677111631AP05940811501	AP034346 4171 41	part B = 6	
AP034598 4704 44 part B = 6 AP0 677111631AP05940811501 AP034833 4675 45 part B = 6 AP0 677111631AP05940811501 AP034886 4497 46 part B = 6 AP0 677111631AP05940811501 AP034859 4285 47 part B = 6 AP0 677111631AP05940811501 AP034553 4039 48 part B = 6 AP0 677111631AP05940811501		The state of the s	
AP034833 4675 45 part B = 6 AP0 677111631AP05940811501 AP034886 4497 46 part B = 6 AP0 677111631AP05940811501 AP034859 4285 47 part B = 6 AP0 677111631AP05940811501 AP034553 4039 48 part B = 6 AP0 677111631AP05940811501	AP034537 4652 43	part B = 6	
AP034886 4497 46 part B = 6 AP0 677111631AP05940811501 AP034859 4285 47 part B = 6 AP0 677111631AP05940811501 AP034553 4039 48 part B = 6 AP0 677111631AP05940811501			
AP034859 4285 47 part B = 6 AP0 677111631AP05940811501 AP034553 4039 48 part B = 6 AP0 677111631AP05940811501		• The state of the	
AP034553 4039 48 part B = 6 AP0 677111631AP05940811501		•	
AP036595 4342 49 part B = 7 AP0 677111631AP05940811501			
	AP036595 4342 49	part B = 7	AP0 677111631AP05940811501

AP036829 4599 50	part B = 7	AP0 677111631AP05940811501
AP037010 4557 51	part B = 7	AP0 677111631AP05940811501
AP037201 4485 52	part B = 7	AP0 677111631AP05940811501
AP037532 4373 53	part B = 7	AP0 677111631AP05940811501
AP037262 4242 54	part B = 7	AP0 677111631AP05940811501
AP037022 4177 55	part B = 7	AP0 677111631AP05940811501
AP036818 4229 56	part B = 7	AP0 677111631AP05940811501
AP039323 4624 57	part B = 8	AP0 677111631AP05940811501
AP039506 4546 58	part B = 8	AP0 677111631AP05940811501
AP039573 4460 59	part B = 8	AP0 677111631AP05940811501
AP039630 4363 60	part B = 8	AP0 677111631AP05940811501
AP039662 4237 61	part B = 8	AP0 677111631AP05940811501
AP039519 4268 62	part B = 8	AP0 677111631AP05940811501
AP039437 4341 63	part B = 8	AP0 677111631AP05940811501
AP039345 4428 64	part B = 8	AP0 677111631AP05940811501
AP040043 4067 65	part B = 9	AP0 677111631AP05940811501
AP040043 4007 03 AP040186 4213 66	part B = 9	APO 677111631AP05940811501
AP040186 4213 66 AP040346 4278 67	part B = 9	APO 677111631AP05940811501
AP040346 4278 67 AP040442 4358 68	part B = 9	APO 677111631AP05940811501
AP040442 4338 68 AP040620 4395 69	part B = 9	APO 677111631AP05940811501
AP040020 4393 09 AP040572 4214 70	part B = 9	AP0 677111631AP05940811501
AP040372 4214 70 AP040376 4248 71	part B = 9	APO 677111631AP05940811501
AP040376 4248 71 AP040269 4149 72	part B = 9	APO 677111631AP05940811501
AP040269 4149 72 AP041782 4524 73	part B = 9	APO 677111631AP05940811501
AP041782 4524 75 AP041967 4627 74	part B = 10	APO 677111631AP05940811501
	part B = 10	APO 677111631AP05940811501
AP042106 4596 75		APO 677111631AP05940811501 APO 677111631AP05940811501
AP042255 4544 76 AP042309 4387 77	part B = 10 part B = 10	APO 677111631AP05940811501
AP042309 4387 77 AP042086 4269 78	part B = 10	APO 677111631AP05940811501
AP042080 4209 78 AP041974 4325 79	part B = 10	APO 677111631AP05940811501
AP041974 4323 79 AP041867 4378 80	part B = 10	APO 677111631AP05940811501
AP044069 4120 81	part B = 10	APO 677111631AP05940811501
AP044209 4120 81 AP044222 4357 82	part B = 11	APO 677111631AP05940811501
AP044222 4337 82 AP044338 4496 83	part B = 11	APO 677111631AP05940811501
AP044538 4496 83 AP044548 4611 84	part B = 11	APO 677111631AP05940811501
AP044717 4594 85	part B = 11	AP0 677111631AP05940811501
AP044717 4394 63 AP044725 4406 86	part B = 11	AP0 677111631AP05940811501
AP044600 4290 87	part B = 11	AP0 677111631AP05940811501
AP044295 4167 88	part B = 11	AP0 677111631AP05940811501
AP047011 4308 89	part B = 12	AP0 677111631AP05940811501
AP047011 4308 69 AP047018 4471 90	part B = 12	AP0 677111631AP05940811501
AP047117 4501 91	part B = 12	AP0 677111631AP05940811501
AP047717 430191 AP047246 4502 92	part B = 12	AP0 677111631AP05940811501
AP047347 4331 93	part B = 12	AP0 677111631AP05940811501
AP047308 4167 94	part B = 12	AP0 677111631AP05940811501
AP047308 4107 94 AP047206 4154 95	part B = 12	APO 677111631AP05940811501
AP047206 4154 95 AP047091 4212 96	part B = 12	APO 677111631AP05940811501
AP047091 4212 96 AP047939 4191 97	part B = 13	APO 677111631AP05940811501
AP047939 4191 97 AP047957 4317 98	part B = 13	APO 677111631AP05940811501
AP047957 4317 98 AP048005 4392 99	part B = 13	AP0 677111631AP05940811501 AP0 677111631AP05940811501
AP048005 4392 99 AP048084 4462 100	part B = 13	APO 677111631AP05940811501 APO 677111631AP05940811501
AF 040004 4402 100	part b = 13	AFU 07/11103 IMFU39406 1130 I

AP048193 4479 101	part B = 13	AP0 677111631AP05940811501
AP048208 4369 102	part B = 13	AP0 677111631AP05940811501
AP048146 4290 103	part B = 13	AP0 677111631AP05940811501
AP048074 4201 104	part B = 13	AP0 677111631AP05940811501
AP048868 4471 105	part B = 14	AP0 677111631AP05940811501
AP049032 4442 106	part B = 14	AP0 677111631AP05940811501
AP049100 4371 107	part B = 14	AP0 677111631AP05940811501
AP049146 4299 108	part B = 14	AP0 677111631AP05940811501
AP049171 4149 109	part B = 14	AP0 677111631AP05940811501
AP049016 4210 110	part B = 14	AP0 677111631AP05940811501
AP048902 4229 111	part B = 14	AP0 677111631AP05940811501
AP048848 4296 112	part B = 14	AP0 677111631AP05940811501
AP049811 4258 113	part B = 15	AP0 677111631AP05940811501
AP049780 4398 114	part B = 15	AP0 677111631AP05940811501
AP049829 4467 115	part B = 15	AP0 677111631AP05940811501 AP0 677111631AP05940811501
AP049920 4512 116	part B = 15	AP0 677111631AP05940811501 AP0 677111631AP05940811501
AP050048 4562 117	part B = 15	AP0 677111631AP05940811501 AP0 677111631AP05940811501
AP050076 4437 118	part B = 15	APO 677111631AP05940811501
AP050030 4379 119	part B = 15	APO 677111631AP05940811501
AP049937 4281 120	part B = 15	APO 677111631AP05940811501
AP050958 4410 121	part B = 16	AP0 677111631AP05940811501
AP051217 4460 122	part B = 16	AP0 677111631AP05940811501
AP051360 4390 123	part B = 16	AP0 677111631AP05940811501
AP051522 4339 124	part B = 16	AP0 677111631AP05940811501
AP051531 4226 125	part B = 16	AP0 677111631AP05940811501
AP051325 4127 126	part B = 16	AP0 677111631AP05940811501
AP051196 4194 127	part B = 16	AP0 677111631AP05940811501
AP051102 4263 128	part B = 16	AP0 677111631AP05940811501
AP051966 4423 129	part B = 17	AP0 677111631AP05940811501
AP052067 4494 130	part B = 17	AP0 677111631AP05940811501
AP052253 4564 131	part B = 17	AP0 677111631AP05940811501
AP052360 4481 132	part B = 17	AP0 677111631AP05940811501
AP052404 4313 133	part B = 17	AP0 677111631AP05940811501
AP052232 4235 134	part B = 17	AP0 677111631AP05940811501
AP052141 4297 135	part B = 17	AP0 677111631AP05940811501
AP052057 4346 136	part B = 17	AP0 677111631AP05940811501
AP053954 4267 137	part B = 18	AP0 677111631AP05940811501
AP054097 4417 138	part B = 18	AP0 677111631AP05940811501
AP054236 4402 139	part B = 18	AP0 677111631AP05940811501
AP054453 4388 140	part B = 18	AP0 677111631AP05940811501
AP054535 4294 141	part B = 18	AP0 677111631AP05940811501
AP054479 4143 142	part B = 18	AP0 677111631AP05940811501
AP054314 4137 143	part B = 18	AP0 677111631AP05940811501
AP054099 4180 144	part B = 18	AP0 677111631AP05940811501
AP055850 4294 145	part B = 19	AP0 677111631AP05940811501
AP056044 4438 146	part B = 19	AP0 677111631AP05940811501
AP056232 4433 147	part B = 19	AP0 677111631AP05940811501
AP056424 4373 148	part B = 19	AP0 677111631AP05940811501 AP0 677111631AP05940811501
AP056474 4185 149	part B = 19	AP0 677111631AP05940811501
AP056253 4228 150	part B = 19	AP0 677111631AP05940811501 AP0 677111631AP05940811501
AFU30233 4220 130	part 6 - 19	AFU 077 11103 1AFU39406 1150 1

AP056152 4292 151	part B = 19	AP0 677111631AP05940811501
AP056075 4235 152	part B = 19	AP0 677111631AP05940811501
AP057997 4088 153	part B = 20	AP0 677111631AP05940811501
AP058078 4267 154	part B = 20	AP0 677111631AP05940811501
AP058216 4350 155	part B = 20	AP0 677111631AP05940811501
AP058338 4427 156	part B = 20	AP0 677111631AP05940811501
AP058520 4470 157	part B = 20	APO 677111631AP05940811501
AP058392 4313 158	part B = 20	APO 677111631AP05940811501
AP058276 4196 159	part B = 20	APO 677111631AP05940811501
AP058166 4079 160	part B = 20	APO 677111631AP05940811501
AP059398 4180 161	part B = 21	AP0 677111631AP05940811501
AP059439 4321 162	part B = 21	AP0 677111631AP05940811501
AP059592 4345 163	part B = 21	AP0 677111631AP05940811501
AP059654 4358 164	part B = 21	AP0 677111631AP05940811501
AP059711 4337 165	part B = 21	AP0 677111631AP05940811501
AP059683 4226 166	part B = 21	AP0 677111631AP05940811501
AP059644 4147 167	part B = 21	AP0 677111631AP05940811501
AP059533 4146 168	part B = 21	AP0 677111631AP05940811501
APO 7721 4315 169	part B = 22	AP0 680811600AP05522911575
APO 7842 4392 170	part B = 22	AP0 680811600AP05522911575
APO 8018 4391 171	part B = 22	AP0 680811600AP05522911575
APO 8139 4324 172	part B = 22	AP0 680811600AP05522911575
APO 8225 4208 173	part B = 22	APO 680811600AP05522911575
APO 8128 4162 174	part B = 22	APO 680811600AP05522911575
APO 8016 4189 175	part B = 22	APO 680811600AP05522911575
		APO 680811600AP05522911575
APO 7911 4232 176	part B = 22	
APO 8951 3950 177	part B = 23	APO 680811600AP05522911575
APO 8964 4005 178	part B = 23	APO 680811600AP05522911575
APO 8972 4049 179	part B = 23	APO 680811600APO5522911575
APO 8997 4105 180	part B = 23	APO 680811600AP05522911575
APO 9090 4193 181	part B = 23	AP0 680811600AP05522911575
APO 9104 4145 182	part B = 23	AP0 680811600AP05522911575
APO 9098 4065 183	part B = 23	AP0 680811600AP05522911575
APO 9052 3993 184	part B = 23	AP0 680811600AP05522911575
APO 9146 4137 185	part B = 24	AP0 680811600AP05522911575
APO 9168 4255 186	part B = 24	AP0 680811600AP05522911575
AP0 9233 4354 187	part B = 24	AP0 680811600AP05522911575
APO 9317 4431 188	part B = 24	AP0 680811600AP05522911575
AP0 9481 4441 189	part B = 24	AP0 680811600AP05522911575
APO 9516 4333 190	part B = 24	AP0 680811600AP05522911575
APO 9476 4256 191	part B = 24	AP0 680811600AP05522911575
APO 9383 4168 192	part B = 24	AP0 680811600AP05522911575
AP010323 4347 193	part B = 25	AP0 680811600AP05522911575
AP010505 4363 194	part B = 25	AP0 680811600AP05522911575
AP010603 4325 195	part B = 25	AP0 680811600AP05522911575
AP010706 4266 196	part B = 25	AP0 680811600AP05522911575
AP010765 4122 197	part B = 25	AP0 680811600AP05522911575
AP010557 4093 198	part B = 25	AP0 680811600AP05522911575
AP010469 4152 199	part B = 25	AP0 680811600AP05522911575
AP010398 4211 200	part B = 25	APO 680811600AP05522911575
711 010000 4211 200	part b 20	7.1. 0 0000 1 1000/11 000220 1 10/0

D044000 4000 004	- I D - 00	A DO COOOLI COO A DOFFOOOLI FTF
P011699 4388 201	part B = 26	AP0 680811600AP05522911575
AP011886 4399 202	part B = 26	AP0 680811600AP05522911575
AP011984 4359 203	part B = 26	AP0 680811600AP05522911575
AP012074 4299 204	part B = 26	AP0 680811600AP05522911575
AP012373 3996 205	part B = 26	AP0 680811600AP05522911575
AP012108 4065 206	part B = 26	AP0 680811600AP05522911575
AP011993 4128 207	part B = 26	APO 680811600AP05522911575
AP011816 4214 208	part B = 26	APO 680811600AP05522911575
		APO 680811600AP05522911575
AP012503 4200 209	part B = 27	
AP012474 4309 210	part B = 27	AP0 680811600AP05522911575
AP012557 4357 211	part B = 27	AP0 680811600AP05522911575
AP012675 4340 212	part B = 27	AP0 680811600AP05522911575
AP012749 4205 213	part B = 27	AP0 680811600AP05522911575
AP012715 4114 214	part B = 27	AP0 680811600AP05522911575
AP012650 4055 215	part B = 27	AP0 680811600AP05522911575
AP012538 4127 216	part B = 27	AP0 680811600AP05522911575
AP013415 4236 217	part B = 28	AP0 680811600AP05522911575
AP013455 4309 218	part B = 28	AP0 680811600AP05522911575
AP013510 4347 219	part B = 28	APO 680811600AP05522911575
AP013567 4271 220	part B = 28	APO 680811600AP05522911575
	The state of the s	APO 680811600AP05522911575
AP013584 4169 221	part B = 28	
AP013545 4090 222	part B = 28	APO 680811600AP05522911575
AP013493 4056 223	part B = 28	AP0 680811600AP05522911575
AP013394 4118 224	part B = 28	AP0 680811600AP05522911575
AP013588 4005 225	part B = 29	AP0 680811600AP05522911575
AP013675 4147 226	part B = 29	AP0 680811600AP05522911575
AP013780 4211 227	part B = 29	AP0 680811600AP05522911575
AP013940 4284 228	part B = 29	AP0 680811600AP05522911575
AP014066 4267 229	part B = 29	AP0 680811600AP05522911575
AP014022 4128 230	part B = 29	AP0 680811600AP05522911575
AP013945 4062 231	part B = 29	AP0 680811600AP05522911575
AP013860 3997 232	part B = 29	AP0 680811600AP05522911575
AP015312 4109 233	part B = 30	APO 680811600AP05522911575
AP015576 4213 234	part B = 30	APO 680811600AP05522911575
	part B = 30	APO 680811600AP05522911575
AP015908 4228 235	· ·	
AP016188 4184 236	part B = 30	APO 680811600AP05522911575
AP016430 4080 237	part B = 30	APO 680811600AP05522911575
AP016140 4019 238	part B = 30	AP0 680811600AP05522911575
AP015929 4051 239	part B = 30	AP0 680811600AP05522911575
AP015703 4031 240	part B = 30	AP0 680811600AP05522911575
AP017161 4037 241	part B = 31	AP0 680811600AP05522911575
AP017159 4140 242	part B = 31	AP0 680811600AP05522911575
AP017214 4157 243	part B = 31	AP0 680811600AP05522911575
AP017311 4136 244	part B = 31	APO 680811600AP05522911575
AP017378 4054 245	part B = 31	AP0 680811600AP05522911575
AP017329 3982 246	part B = 31	AP0 680811600AP05522911575
AP017263 3968 247	part B = 31	APO 680811600AP05522911575
AP017203 3900 247 AP017215 3990 248	part B = 31	APO 680811600AP05522911575
	part B = 32	APO 680811600AP05522911575
AP017485 4012 249		
AP017621 4117 250	part B = 32	AP0 680811600AP05522911575

AP017792 4219 251	part B = 32	AP0 680811600AP05522911575
AP018041 4152 252	part B = 32	AP0 680811600AP05522911575
AP018189 4060 253	part B = 32	AP0 680811600AP05522911575
AP018065 3971 254	part B = 32	AP0 680811600AP05522911575
AP017882 3985 255	part B = 32	AP0 680811600AP05522911575
AP017690 4027 256	part B = 32	AP0 680811600AP05522911575
AP019888 4058 257	part B = 33	AP0 680811600AP05522911575
AP020304 4138 258	part B = 33	AP0 680811600AP05522911575
AP020787 4122 259	part B = 33	APO 680811600AP05522911575
AP021037 4118 260	part B = 33	APO 680811600AP05522911575
AP021394 4039 261	part B = 33	APO 680811600AP05522911575
AP021175 3912 262	part B = 33	APO 680811600AP05522911575
AP020718 3938 263	part B = 33	APO 680811600AP05522911575
AP020354 3958 264	part B = 33	APO 680811600AP05522911575
AP023096 4028 265	part B = 34	APO 680811600AP05522911575
AP023305 4123 266	part B = 34	APO 680811600AP05522911575
AP023441 4133 267	part B = 34	APO 680811600AP05522911575
AP023551 4121 268	part B = 34	APO 680811600AP05522911575
AP023740 4019 269	part B = 34	APO 680811600AP05522911575
AP023579 3932 270	part B = 34	APO 680811600AP05522911575
AP023444 3919 271	part B = 34	APO 680811600AP05522911575
AP023265 3955 272	part B = 34	APO 680811600AP05522911575
AP023733 3935 272	part B = 35	APO 680811600AP05522911575
AP023733 3333 273 AP023808 3982 274	part B = 35	APO 680811600AP05522911575
AP023864 3999 275	part B = 35	APO 680811600AP05522911575
AP023804 3993 276	part B = 35	APO 680811600AP05522911575
AP023921 3993 270 AP023971 3936 277	part B = 35	APO 680811600AP05522911575
AP023971 3930 277 AP023906 3870 278	part B = 35	APO 680811600AP05522911575
AP023856 3876 278	part B = 35	APO 680811600AP05522911575
AP023813 3893 280	part B = 35	APO 680811600AP05522911575
AP024258 3904 281	part B = 36	APO 680811600AP05522911575
AP024506 4047 282	part B = 36	APO 680811600AP05522911575
AP024800 4050 283	part B = 36	AP0 680811600AP05522911575
AP025002 4075 284	part B = 36	AP0 680811600AP05522911575
AP025278 4016 285	part B = 36	AP0 680811600AP05522911575
AP025143 3900 286	part B = 36	APO 680811600AP05522911575
AP024841 3882 287	part B = 36	APO 680811600AP05522911575
AP024614 3858 288	part B = 36	APO 680811600AP05522911575
AP026250 3914 289	part B = 37	AP0 680811600AP05522911575
AP026436 4022 290	part B = 37	APO 680811600AP05522911575
AP026571 4038 291	part B = 37	APO 680811600AP05522911575
AP026712 4034 292	part B = 37	AP0 680811600AP05522911575
AP026816 3980 293	part B = 37	APO 680811600AP05522911575
AP026725 3898 294	part B = 37	AP0 680811600AP05522911575
AP026624 3871 295	part B = 37	APO 680811600AP05522911575
AP026507 3851 296	part B = 37	APO 680811600AP05522911575
AP027400 3754 297	part B = 38	APO 680811600AP05522911575
AP027502 3919 298	part B = 38	APO 680811600AP05522911575
AP027615 3980 299	part B = 38	APO 680811600AP05522911575
AP027740 4043 300	part B = 38	APO 680811600AP05522911575
711 027740 4040 000	part b = 00	0 000011000/11 000220110/0

APDC27857 3929 302 APDC27857 3929 302 APDC27857 3929 303 APDC27857 3929 304 APDC27857 3978 304 APDC27857 3978 304 APDC27857 3978 304 APDC28096 3880 305 APDC28096 3880 305 APDC28096 3880 305 APDC28096 3880 305 APDC28096 3880 307 APDC28096 3880 307 APDC28045 3987 306 APDC28045 3987 306 APDC28045 3985 307 APDC28046 3985 309 APD 680811600APD5522911575 APDC28040 3899 309 APD 680811600APD5522911575 APDC28046 3816 310 APD 680811600APD5522911575 APDC28046 3816 310 APD 680811600APD5522911575 APDC28046 3816 310 APD 680811600APD5522911575 APDC28047 3799 313 APD 680811600APD5522911575 APDC29047 3799 313 APD 680811600APD5522911575 APDC29581 3971 317 APDC29581 3971 317 APDC29581 3971 317 APDC29581 3971 317 APDC29500 3853 318 APD 680811600APD5522911575 APDC299500 3853 318 APD 680811600APD5522911575 APDC299277 3758 320 APD 680811600APD5522911575 APDC39930 3932 321 APD 8 8 40 APD 680811600APD5522911575 APDC3997 3758 320 APD 680811600APD5522911575 APD3998 3932 321 APD 8 8 41 APD 680811600APD5522911575 APD3998 392 322 APD 8 8 41 APD 680811600APD5522911575 APD31509 3928 324 APD 8 80811600APD5522911575 APD31509 3928 324 APD 8 80811600APD5522911575 APD31509 3928 324 APD 8 80811600APD5522911575 APD31509 3928 324 APD 680811600APD5522911575 APD32462 3691 330 APD 680811600APD5522911575 APD332462 3691 330 APD 680811600APD5522911575 APD332483 3543 344 APD 680811600APD5522911575 APD332485 3562 333 APD 8 8 42 APD 680811600APD5522911575 APD332485 3562 333 APD 8 8 42 APD 680811600APD5522911575 APD33368 3964 338 APD 68081	AP027879 4038 301	part B = 38	AP0 680811600AP05522911575
AP027667 3798 304	AP027857 3929 302	part B = 38	AP0 680811600AP05522911575
AP027667 3798 304	AP027777 3863 303	part B = 38	AP0 680811600AP05522911575
AP028096 3880 305 AP028345 3977 306 AP028426 3985 307 AP0288426 3985 307 AP028842 3990 308 AP0 680811600AP05522911575 AP028842 3990 308 AP0 680811600AP05522911575 AP028810 3899 309 AP0 680811600AP05522911575 AP028843 3811 311 AP028626 3816 310 AP0 8808138100AP05522911575 AP028843 3811 311 AP0286278 3826 312 AP0 880811600AP05522911575 AP028431 3811 311 AP0286278 3826 312 AP0 880811600AP05522911575 AP02947 3799 313 AP0 880811600AP05522911575 AP02947 3799 313 AP0 880811600AP05522911575 AP02947 3799 313 AP0 880811600AP05522911575 AP02947 3799 314 AP0 880811600AP05522911575 AP02957 390 314 AP0 880811600AP05522911575 AP029455 4019 316 AP0 880811600AP05522911575 AP029581 3971 317 AP029581 3973 319 AP0 880811600AP05522911575 AP029392 3797 319 AP0 880811600AP05522911575 AP029392 3797 319 AP0 880811600AP05522911575 AP029392 3797 319 AP0 880811600AP05522911575 AP039392 3797 319 AP0 880811600AP05522911575 AP039392 3797 319 AP0 880811600AP05522911575 AP03139 3758 320 AP0 880811600AP05522911575 AP03139 3758 320 AP0 880811600AP05522911575 AP03139 3759 327 AP031154 3965 323 AP01 8 = 41 AP0 880811600AP05522911575 AP03139 3775 325 AP031154 3965 323 AP01 8 = 41 AP0 880811600AP05522911575 AP03139 3775 325 AP03139 3729 326 AP01 8 = 41 AP0 880811600AP05522911575 AP03139 3729 326 AP03 8808 3908 328 AP0 8808 31600AP05522911575 AP03139 3729 326 AP01 8 = 41 AP0 880811600AP05522911575 AP03139 3759 327 AP03 8808 8808 340 AP0 8808 8808 8808 8809 340 AP0 8808 8808 8808		part B = 38	AP0 680811600AP05522911575
AP028345 3977 306 AP028426 3985 307 AP028426 3985 307 AP0288402 3990 308 AP0 680811600AP05522911575 AP028840 3899 309 AP0 680811600AP05522911575 AP028840 3899 309 AP0 680811600AP05522911575 AP0288263 316 310 AP0 680811600AP05522911575 AP0288278 3826 312 AP0 680811600AP05522911575 AP028278 3826 312 AP0 680811600AP05522911575 AP028278 3826 312 AP0 680811600AP05522911575 AP02947 3799 313 AP0 680811600AP05522911575 AP029172 3901 314 AP1 B = 39 AP0 680811600AP05522911575 AP029172 3901 314 AP1 B = 40 AP0 680811600AP05522911575 AP029323 3961 315 AP029455 4019 316 AP1 B = 40 AP0 680811600AP05522911575 AP029503 3853 318 AP1 B = 40 AP0 680811600AP05522911575 AP029950 3853 318 AP1 B = 40 AP0 680811600AP05522911575 AP029977 3758 320 AP1 B = 40 AP0 680811600AP05522911575 AP03998 3932 321 AP1 B = 40 AP0 680811600AP05522911575 AP03998 3932 321 AP1 B = 41 AP0 680811600AP05522911575 AP039068 3992 322 AP1 B = 41 AP0 680811600AP05522911575 AP031154 3965 323 AP1 B = 41 AP0 680811600AP05522911575 AP031350 3928 324 AP1 B = 41 AP0 680811600AP05522911575 AP031399 3720 326 AP031299 3772 326 AP031299 3772 326 AP031299 3772 326 AP03189 3779 327 AP03189 3779 329 AP1 B = 41 AP0 680811600AP05522911575 AP031399 3720 326 AP03189 3759 327 AP03189 3799 327 AP03885 3719 329 AP1 B = 41 AP0 680811600AP05522911575 AP031399 3720 326 AP1 B = 41 AP0 680811600AP05522911575 AP031399 3720 326 AP1 B = 41 AP0 680811600AP05522911575 AP031399 3720 326 AP1 B = 41 AP0 680811600AP05522911575 AP032385 3719 329 AP1 B = 41 AP0 680811600AP05522911575 AP033285 3719 329 AP1 B = 42 AP0 680811600AP05522911575 AP033285 373 329 AP1 B = 41 AP0 680811600AP05522911575 AP033285 373 329 AP1 B = 41 AP0 680811600AP05522911575 AP033285 3643 330 AP1 B = 42 AP0 680811600AP05522911575 AP033285 3643 330 AP1 B = 42 AP0 680811600AP05522911575 AP033285 3643 330 AP1 B = 42 AP0 680811600AP05522911575 AP033294 3631 336 AP1 B = 42 AP0 680811600AP05522911575 AP033485 3652 333 AP1 B = 42 AP0 680811600AP05522911575 AP033485 3652 333 AP1 B = 43 AP0 680811600AP05522911575 AP033370 3764 344 AP1			
AP028426 3985 307 AP028423 3990 308 AP0 680811600AP05522911575 AP028810 3899 309 AP0 680811600AP05522911575 AP028826 3816 310 AP0 880811600AP05522911575 AP028826 3816 310 AP0 880811600AP05522911575 AP0288278 3826 312 AP0 680811600AP05522911575 AP0288278 3826 312 AP0 680811600AP05522911575 AP0289278 3826 312 AP0 680811600AP05522911575 AP029047 3799 313 AP0 680811600AP05522911575 AP029172 3901 314 AP1 B = 40 AP0 680811600AP05522911575 AP029323 3961 315 AP029353 3961 315 AP029455 4019 316 AP029455 4019 316 AP029457 319 AP0 680811600AP05522911575 AP029945 313 AP029500 3853 318 AP1 B = 40 AP0 680811600AP05522911575 AP0299392 3797 319 AP0 680811600AP05522911575 AP029392 3797 319 AP0 680811600AP05522911575 AP029392 3797 319 AP0 680811600AP05522911575 AP030968 3992 322 AP1 B = 40 AP0 680811600AP05522911575 AP030968 3992 322 AP1 B = 41 AP0 680811600AP05522911575 AP031154 3965 323 AP1 B = 41 AP0 680811600AP05522911575 AP031154 3965 323 AP1 B = 41 AP0 680811600AP05522911575 AP031529 3775 325 AP031529 3775 325 AP031529 3775 325 AP03139 3759 327 AP03189 3790 328 AP0 680811600AP05522911575 AP031399 3790 328 AP0 680811600AP05522911575 AP031399 3720 326 AP1 B = 41 AP0 680811600AP05522911575 AP031399 3790 328 AP0 680811600AP05522911575 AP031399 3790 328 AP0 680811600AP05522911575 AP032468 3662 331 AP1 B = 41 AP0 680811600AP05522911575 AP032468 3662 331 AP1 B = 42 AP0 680811600AP05522911575 AP032468 3662 331 AP1 B = 42 AP0 680811600AP05522911575 AP032468 3662 331 AP1 B = 42 AP0 680811600AP05522911575 AP032468 3662 331 AP1 B = 42 AP0 680811600AP05522911575 AP033246 3663 331 AP1 B = 42 AP0 680811600AP05522911575 AP033246 3663 331 AP1 B = 43 AP0 680811600AP05522911575 AP033246 3663 331 AP1 B = 44 AP0 680811600AP05522911575 AP033246 3663 331 AP1 B = 44 AP0 680811600AP05522911575 AP033246 3663 331 AP1 B = 44 AP0 680811600AP05522911575 AP033246 3662 331 AP1 B = 44 AP0 680811600AP05522911575 AP03348 3839 AP1 B = 43 AP0 680811600AP05522911575 AP03348 3839 AP1 B = 44 AP0 680811600AP05522911575 AP03349 3334 AP1 B = 43 AP0 680811600AP05522			
AP028642 3990 308		A COLOR OF THE COL	
AP028810 3899 309			
AP028626 3816 310 part B = 39 AP0 680811600AP05522911575 AP028431 3811 311 part B = 39 AP0 680811600AP05522911575 AP028278 3826 312 part B = 39 AP0 680811600AP05522911575 AP029047 3799 313 part B = 40 AP0 680811600AP05522911575 AP029047 3799 313 part B = 40 AP0 680811600AP05522911575 AP029323 3961 315 part B = 40 AP0 680811600AP05522911575 AP029353 3961 315 part B = 40 AP0 680811600AP05522911575 AP029354 3071 317 part B = 40 AP0 680811600AP05522911575 AP029581 3971 317 part B = 40 AP0 680811600AP05522911575 AP029581 3971 317 part B = 40 AP0 680811600AP05522911575 AP029581 3971 317 part B = 40 AP0 680811600AP05522911575 AP029590 3853 318 part B = 40 AP0 680811600AP05522911575 AP029392 3797 319 part B = 40 AP0 680811600AP05522911575 AP029392 3797 319 part B = 40 AP0 680811600AP05522911575 AP030698 3932 321 part B = 41 AP0 680811600AP05522911575 AP030698 3932 322 part B = 41 AP0 680811600AP05522911575 AP031059 3932 322 part B = 41 AP0 680811600AP05522911575 AP031359 3928 324 part B = 41 AP0 680811600AP05522911575 AP031529 3775 325 part B = 41 AP0 680811600AP05522911575 AP031299 3720 326 part B = 41 AP0 680811600AP05522911575 AP031399 3759 327 part B = 41 AP0 680811600AP05522911575 AP031399 3759 327 part B = 41 AP0 680811600AP05522911575 AP031399 3759 327 part B = 41 AP0 680811600AP05522911575 AP0332385 3719 329 part B = 41 AP0 680811600AP05522911575 AP032385 3719 329 part B = 41 AP0 680811600AP05522911575 AP032495 3627 332 part B = 42 AP0 680811600AP05522911575 AP032495 3627 332 part B = 42 AP0 680811600AP05522911575 AP032495 3627 332 part B = 42 AP0 680811600AP05522911575 AP032495 3627 332 part B = 42 AP0 680811600AP05522911575 AP032495 3627 332 part B = 42 AP0 680811600AP05522911575 AP032495 3627 332 part B = 42 AP0 680811600AP05522911575 AP033294 3631 336 part B = 42 AP0 680811600AP05522911575 AP033294 3631 336 part B = 42 AP0 680811600AP05522911575 AP033294 3631 339 part B = 43 AP0 680811600AP05522911575 AP033370 3764 344 part B = 43 AP0 680811600AP05522911575 AP033370 3764 344 part B = 43 AP0 680811600AP05522	The state of the s	•	
AP028273 3811 311			
AP028278 3826 312 part B = 39 AP0 680811600AP05522911575 AP029047 3799 313 part B = 40 AP0 680811600AP05522911575 AP029172 3901 314 part B = 40 AP0 680811600AP05522911575 AP029323 3961 315 part B = 40 AP0 680811600AP05522911575 AP0293581 3971 317 part B = 40 AP0 680811600AP05522911575 AP029581 3971 317 part B = 40 AP0 680811600AP05522911575 AP029581 3971 317 part B = 40 AP0 680811600AP05522911575 AP029580 3853 318 part B = 40 AP0 680811600AP05522911575 AP029500 3853 318 part B = 40 AP0 680811600AP05522911575 AP029392 3797 319 part B = 40 AP0 680811600AP05522911575 AP029392 3797 3758 320 part B = 41 AP0 680811600AP05522911575 AP030968 3992 321 part B = 41 AP0 680811600AP05522911575 AP030968 3992 322 part B = 41 AP0 680811600AP05522911575 AP03154 3965 323 part B = 41 AP0 680811600AP05522911575 AP031529 3775 325 part B = 41 AP0 680811600AP05522911575 AP031529 3775 325 part B = 41 AP0 680811600AP05522911575 AP031299 3720 326 part B = 41 AP0 680811600AP05522911575 AP031299 3720 326 part B = 41 AP0 680811600AP05522911575 AP031299 3720 326 part B = 41 AP0 680811600AP05522911575 AP031393 3759 327 part B = 41 AP0 680811600AP05522911575 AP032385 3719 329 part B = 41 AP0 680811600AP05522911575 AP032468 3662 331 part B = 42 AP0 680811600AP05522911575 AP032468 3662 331 part B = 42 AP0 680811600AP05522911575 AP032468 3662 331 part B = 42 AP0 680811600AP05522911575 AP032485 3627 332 part B = 42 AP0 680811600AP05522911575 AP032485 3562 333 part B = 42 AP0 680811600AP05522911575 AP032485 3563 334 part B = 42 AP0 680811600AP05522911575 AP032485 3563 334 part B = 42 AP0 680811600AP05522911575 AP033485 3563 334 part B = 42 AP0 680811600AP05522911575 AP033485 3563 334 part B = 42 AP0 680811600AP05522911575 AP033485 3563 334 part B = 42 AP0 680811600AP05522911575 AP033485 3986 330 part B = 43 AP0 680811600AP05522911575 AP033486 3986 330 part B = 43 AP0 680811600AP05522911575 AP033498 338 339 part B = 43 AP0 680811600AP05522911575 AP033498 338 339 part B = 43 AP0 680811600AP05522911575 AP033498 338 339 part B = 43 AP0 680811600AP0552			
AP029047 3799 313			
AP029172 3901 314			
AP029323 3961 315 AP029455 4019 316 AP029581 3971 317 AP029581 3971 317 AP029581 3971 317 AP029580 3853 318 AP029392 3797 319 AP029392 3797 319 AP029277 3758 320 AP0 680811600AP05522911575 AP029392 3797 319 AP030689 3932 321 AP0 680811600AP05522911575 AP030699 3932 321 AP030693 3932 321 AP030693 3932 322 AP031154 3965 323 AP031154 3965 323 AP031350 3928 324 AP0 680811600AP05522911575 AP031393 3759 325 AP03139 3759 327 AP031393 3759 327 AP031393 3759 327 AP031393 3759 327 AP031393 3759 327 AP032468 3662 331 AP0 680811600AP05522911575 AP032462 3691 330 AP0 680811600AP05522911575 AP032468 3662 331 AP0 680811600AP05522911575 AP032468 3662 331 AP0 680811600AP05522911575 AP032485 3562 333 AP1 B = 42 AP0 680811600AP05522911575 AP032485 3562 333 AP1 B = 42 AP0 680811600AP05522911575 AP032495 3627 332 AP032495 3627 332 AP0 880811600AP05522911575 AP032495 3627 332 AP032495 3627 332 AP0 880811600AP05522911575 AP032495 3638 339 AP1 B = 42 AP0 680811600AP05522911575 AP032495 3638 334 AP0 880811600AP05522911575 AP032495 3638 339 AP1 B = 42 AP0 680811600AP05522911575 AP033316 3964 338 AP1 B = 43 AP0 680811600AP05522911575 AP033316 3964 338 AP1 B = 43 AP0 680811600AP05522911575 AP033316 3964 338 AP1 B = 43 AP0 680811600AP05522911575 AP033394 3313 AP1 B = 43 AP0 680811600AP05522911575 AP033394 3313 AP1 B = 43 AP0 680811600AP05522911575 AP033316 3964 338 AP1 B = 43 AP0 680811600AP05522911575 AP033495 3964 398 AP1 B = 43 AP0 680811600AP05522911575 AP033495 3964 398 AP1 B = 43 AP0 680811600AP05522911575 AP033495 3964 398 AP1 B = 43 AP0 680811600AP05522911575 AP033495 3964 398 AP1 B = 43 AP0 680811600AP05522911575 AP033493 3973 344 AP			
AP02955 4019 316 AP029581 3971 317 AP029581 3971 317 AP029500 3853 318 AP029500 3853 318 AP029500 3853 318 AP029392 3797 319 AP0 680811600AP05522911575 AP029277 3758 320 AP0 680811600AP05522911575 AP029277 3758 320 AP0 680811600AP05522911575 AP030669 3932 321 AP0 680811600AP05522911575 AP030693 3932 322 AP0 808011600AP05522911575 AP031154 3965 323 AP031154 3965 323 AP031350 3928 324 AP0 680811600AP05522911575 AP031350 3928 324 AP0 680811600AP05522911575 AP031350 3928 324 AP0 680811600AP05522911575 AP031529 3775 325 AP031529 3775 325 AP031529 3720 326 AP03 88 8 8 41 AP0 680811600AP05522911575 AP031139 3759 327 AP03139 3759 327 AP03139 3759 327 AP03285 3719 329 AP0 880811600AP05522911575 AP032462 3691 330 AP0 880811600AP05522911575 AP032468 3662 331 AP0 880811600AP05522911575 AP032468 3662 331 AP0 880811600AP05522911575 AP032485 3662 333 AP01 B = 42 AP0 680811600AP05522911575 AP032485 3662 333 AP01 B = 42 AP0 680811600AP05522911575 AP032495 3627 322 AP0 880811600AP05522911575 AP032495 3627 322 AP0 880811600AP05522911575 AP032495 3627 332 AP01 B = 42 AP0 680811600AP05522911575 AP032495 3627 332 AP01 B = 42 AP0 680811600AP05522911575 AP032495 3627 332 AP01 B = 42 AP0 680811600AP05522911575 AP032495 3627 332 AP01 B = 42 AP0 680811600AP05522911575 AP032495 3627 332 AP01 B = 42 AP0 680811600AP05522911575 AP032495 3627 332 AP01 B = 42 AP0 680811600AP05522911575 AP032495 3633 334 AP01 B = 42 AP0 680811600AP05522911575 AP032495 3633 334 AP01 B = 44 AP0 680811600AP05522911575 AP033294 3858 337 AP01 B = 44 AP0 680811600AP05522911575 AP033294 3858 337 AP01 B = 44 AP0 680811600AP05522911575 AP033294 3858 337 AP01 B = 44 AP0 680811600AP05522911575 AP033495 3627 AP033495 3643 AP0 680811600AP05522911575 AP033498 3964 AP0 680811600AP05522911575 AP033493 3973 344 AP0 680811600AP0552291157			
AP029581 3971 317			
AP029500 3853 318			
AP029392 3797 319			
AP029277 3758 320			
AP030699 3932 321			
AP030968 3992 322 part B = 41 AP0 680811600AP05522911575 AP031154 3965 323 part B = 41 AP0 680811600AP05522911575 AP031350 3928 324 part B = 41 AP0 680811600AP05522911575 AP031529 3775 325 part B = 41 AP0 680811600AP05522911575 AP031299 3720 326 part B = 41 AP0 680811600AP05522911575 AP031299 3720 326 part B = 41 AP0 680811600AP05522911575 AP031299 3720 328 part B = 41 AP0 680811600AP05522911575 AP030961 3790 328 part B = 41 AP0 680811600AP05522911575 AP032385 3719 329 part B = 42 AP0 680811600AP05522911575 AP032462 3691 330 part B = 42 AP0 680811600AP05522911575 AP032463 3662 331 part B = 42 AP0 680811600AP05522911575 AP032495 3627 332 part B = 42 AP0 680811600AP05522911575 AP032495 3627 332 part B = 42 AP0 680811600AP05522911575 AP032485 3562 333 part B = 42 AP0 680811600AP05522911575 AP032485 3563 334 part B = 42 AP0 680811600AP05522911575 AP032495 3627 335 part B = 42 AP0 680811600AP05522911575 AP032495 3627 339 part B = 42 AP0 680811600AP05522911575 AP032394 3631 336 part B = 42 AP0 680811600AP05522911575 AP032394 3631 336 part B = 42 AP0 680811600AP05522911575 AP032394 3631 336 part B = 43 AP0 680811600AP05522911575 AP032394 3383 339 part B = 43 AP0 680811600AP05522911575 AP033316 3964 338 part B = 43 AP0 680811600AP05522911575 AP033968 3906 340 part B = 43 AP0 680811600AP05522911575 AP033968 3906 340 part B = 43 AP0 680811600AP05522911575 AP034080 3732 342 part B = 43 AP0 680811600AP05522911575 AP034080 3732 342 part B = 43 AP0 680811600AP05522911575 AP033379 3735 343 part B = 43 AP0 680811600AP05522911575 AP033379 3735 343 part B = 44 AP0 680811600AP05522911575 AP033379 3735 343 part B = 44 AP0 680811600AP05522911575 AP033403 3739 3735 343 part B = 44 AP0 680811600AP05522911575 AP033403 3739 3735 343 part B = 44 AP0 680811600AP05522911575 AP033403 3739 3735 343 part B = 43 AP0 680811600AP05522911575 AP033403 3739 3745 part B = 44 AP0 680811600AP05522911575 AP033413 3789 347 part B = 44 AP0 680811600AP05522911575 AP038413 3789 347 part B = 44 AP0 680811600AP05522911575 AP038413 3789 347 part B = 44 AP0 6			
AP031154 3965 323			
AP031350 3928 324			
AP031529 3775 325			
AP031299 3720 326			
AP031139 3759 327 AP030961 3790 328 AP030961 3790 328 AP032385 3719 329 AP032462 3691 330 AP032468 3662 331 AP032495 3627 332 AP032485 3562 333 AP032435 3543 334 AP0 680811600AP05522911575 AP032408 3587 335 AP032408 3587 335 AP032408 3587 335 AP032408 3587 335 AP032394 3631 36 AP0 680811600AP05522911575 AP032408 3587 335 AP032408 3587 335 AP032408 3587 335 AP032394 3631 36 AP0 680811600AP05522911575 AP032394 3631 336 AP0 680811600AP05522911575 AP032954 3858 337 AP0 680811600AP05522911575 AP033316 3964 338 AP0 680811600AP05522911575 AP033316 3964 338 AP0 680811600AP05522911575 AP0333612 3938 339 AP1 B = 43 AP0 680811600AP05522911575 AP033968 3906 340 AP0 680811600AP05522911575 AP034080 3732 342 AP0 680811600AP05522911575 AP034080 3732 342 AP0 680811600AP05522911575 AP033370 3764 344 AP0 680811600AP05522911575 AP033370 3764 344 AP0 680811600AP05522911575 AP033370 3764 344 AP0 680811600AP05522911575 AP033413 3789 347 AP0 880811600AP05522911575 AP038413 3789 347 AP0 680811600AP05522911575 AP038413 3789 347 AP0 680811600AP05522911575 AP038413 3789 347 AP0 680811600AP05522911575 AP038433 3876 349 AP0 680811600AP05522911575			
AP030961 3790 328			
AP032385 3719 329			
AP032462 3691 330			
AP032468 3662 331			
AP032495 3627 332			
AP032485 3562 333			
AP032435 3543 334			
AP032408 3587 335 part B = 42 AP0 680811600AP05522911575 AP032954 3858 337 part B = 43 AP0 680811600AP05522911575 AP033968 3964 338 part B = 43 AP0 680811600AP05522911575 AP033968 3906 340 part B = 43 AP0 680811600AP05522911575 AP034302 3830 341 part B = 43 AP0 680811600AP05522911575 AP034080 3732 342 part B = 43 AP0 680811600AP05522911575 AP033739 3735 343 part B = 43 AP0 680811600AP05522911575 AP033370 3764 344 part B = 43 AP0 680811600AP05522911575 AP033370 3764 344 part B = 43 AP0 680811600AP05522911575 AP0334080 3732 342 part B = 43 AP0 680811600AP05522911575 AP033739 3735 343 part B = 44 AP0 680811600AP05522911575 AP036174 3827 346 part B = 44 AP0 680811600AP05522911575 AP036174 3827 346 part B = 45 AP0 680811600AP05522911575 AP038413 3789 347 part B = 46 AP0 680811600AP05522911575 AP039209 3806 348 part B = 47 AP0 680811600AP05522911575 AP039433 3876 349 part B = 48 AP0 680811600AP05522911575			
AP032394 3631 336			
AP032954 3858 337			
AP033316 3964 338			
AP033612 3938 339 part B = 43 AP0 680811600AP05522911575 AP033968 3906 340 part B = 43 AP0 680811600AP05522911575 AP034302 3830 341 part B = 43 AP0 680811600AP05522911575 AP034080 3732 342 part B = 43 AP0 680811600AP05522911575 AP033739 3735 343 part B = 43 AP0 680811600AP05522911575 AP033370 3764 344 part B = 43 AP0 680811600AP05522911575 AP035458 3819 345 part B = 44 AP0 680811600AP05522911575 AP036174 3827 346 part B = 44 AP0 680811600AP05522911575 AP036174 3827 346 part B = 45 AP0 680811600AP05522911575 AP038413 3789 347 part B = 46 AP0 680811600AP05522911575 AP039209 3806 348 part B = 47 AP0 680811600AP05522911575 AP039433 3876 349 part B = 48 AP0 680811600AP05522911575		the state of the s	
AP033968 3906 340			
AP034302 3830 341			
AP034080 3732 342 part B = 43 AP0 680811600AP05522911575 AP033739 3735 343 part B = 43 AP0 680811600AP05522911575 AP033370 3764 344 part B = 43 AP0 680811600AP05522911575 AP035458 3819 345 part B = 44 AP0 680811600AP05522911575 AP036174 3827 346 part B = 45 AP0 680811600AP05522911575 AP038413 3789 347 part B = 46 AP0 680811600AP05522911575 AP039209 3806 348 part B = 47 AP0 680811600AP05522911575 AP039433 3876 349 part B = 48 AP0 680811600AP05522911575			
AP033739 3735 343 part B = 43 AP0 680811600AP05522911575 AP033370 3764 344 part B = 43 AP0 680811600AP05522911575 AP035458 3819 345 part B = 44 AP0 680811600AP05522911575 AP036174 3827 346 part B = 45 AP0 680811600AP05522911575 AP038413 3789 347 part B = 46 AP0 680811600AP05522911575 AP039209 3806 348 part B = 47 AP0 680811600AP05522911575 AP039433 3876 349 part B = 48 AP0 680811600AP05522911575			
AP033370 3764 344 part B = 43 AP0 680811600AP05522911575 AP035458 3819 345 part B = 44 AP0 680811600AP05522911575 AP036174 3827 346 part B = 45 AP0 680811600AP05522911575 AP038413 3789 347 part B = 46 AP0 680811600AP05522911575 AP039209 3806 348 part B = 47 AP0 680811600AP05522911575 AP039433 3876 349 part B = 48 AP0 680811600AP05522911575			
AP035458 3819 345 part B = 44 AP0 680811600AP05522911575 AP036174 3827 346 part B = 45 AP0 680811600AP05522911575 AP038413 3789 347 part B = 46 AP0 680811600AP05522911575 AP039209 3806 348 part B = 47 AP0 680811600AP05522911575 AP039433 3876 349 part B = 48 AP0 680811600AP05522911575		The state of the s	
AP036174 3827 346 part B = 45 AP0 680811600AP05522911575 AP038413 3789 347 part B = 46 AP0 680811600AP05522911575 AP039209 3806 348 part B = 47 AP0 680811600AP05522911575 AP039433 3876 349 part B = 48 AP0 680811600AP05522911575			
AP038413 3789 347 part B = 46 AP0 680811600AP05522911575 AP039209 3806 348 part B = 47 AP0 680811600AP05522911575 AP039433 3876 349 part B = 48 AP0 680811600AP05522911575			
AP039209 3806 348 part B = 47 AP0 680811600AP05522911575 AP039433 3876 349 part B = 48 AP0 680811600AP05522911575			
AP039433 3876 349 part B = 48 AP0 680811600AP05522911575			
AP041048 3796 350 part B = 49 AP0 680811600AP05522911575			
	AP041048 3796 350	part B = 49	AP0 680811600AP05522911575

A DO 40400 0000 054	D FO	ADO 000011000AD0EE00011E7E
AP042198 3802 351	part B = 50	APO 680811600AP05522911575
AP043321 3737 352	part B = 51	APO 680811600AP05522911575
AP044630 3813 353	part B = 52	AP0 680811600AP05522911575
AP046465 3824 354	part B = 53	AP0 680811600AP05522911575
AP047817 3764 355	part B = 54	AP0 680811600AP05522911575
AP049370 3728 356	part B = 55	AP0 680811600AP05522911575
AP050767 3757 357	part B = 56	AP0 680811600AP05522911575
AP051436 3722 358	part B = 57	AP0 680811600AP05522911575
AP053329 3749 359	part B = 58	AP0 680811600AP05522911575
	All the second s	
AP0 1563 8466 1	part C = 44	AP0 676311602AP05938011483
AP0 1600 8540 2	part C = 44	AP0 676311602AP05938011483
AP0 1648 8591 3	part C = 44	AP0 676311602AP05938011483
AP0 1761 8559 4	part C = 44	AP0 676311602AP05938011483
AP0 1789 8445 5	part C = 44	AP0 676311602AP05938011483
AP0 1745 8357 6	part C = 44	AP0 676311602AP05938011483
APO 1697 8346 7	part C = 44	AP0 676311602AP05938011483
APO 1616 8351 8	part C = 44	AP0 676311602AP05938011483
APO 2747 8452 9	part C = 45	AP0 676311602AP05938011483
APO 3219 8587 10	part C = 45	APO 676311602AP05938011483
APO 3511 8551 11	part C = 45	APO 676311602AP05938011483
		APO 676311602AP05938011483
APO 3800 8557 12	part C = 45	APO 676311602APO5938011483
APO 4134 8449 13	part C = 45	
AP0 3723 8378 14	part C = 45	APO 676311602AP05938011483
AP0 3334 8361 15	part C = 45	APO 676311602AP05938011483
AP0 3050 8370 16	part C = 45	AP0 676311602AP05938011483
AP0 6197 8343 17	part C = 46	AP0 676311602AP05938011483
APO 6345 8480 18	part C = 46	AP0 676311602AP05938011483
AP0 6501 8512 19	part C = 46	AP0 676311602AP05938011483
AP0 6596 8510 20	part C = 46	AP0 676311602AP05938011483
AP0 6756 8443 21	part C = 46	AP0 676311602AP05938011483
AP0 6668 8326 22	part C = 46	AP0 676311602AP05938011483
AP0 6532 8307 23	part C = 46	AP0 676311602AP05938011483
AP0 6397 8311 24	part C = 46	AP0 676311602AP05938011483
AP0 6749 8428 25	part C = 47	AP0 676311602AP05938011483
AP0 6775 8476 26	part C = 47	AP0 676311602AP05938011483
AP0 6854 8530 27	part C = 47	AP0 676311602AP05938011483
AP0 6932 8534 28	part C = 47	AP0 676311602AP05938011483
AP0 7024 8492 29	part C = 47	AP0 676311602AP05938011483
AP0 6962 8418 30	part C = 47	APO 676311602AP05938011483
AP0 6899 8393 31	part C = 47	AP0 676311602AP05938011483
AP0 6841 8382 32	part C = 47	AP0 676311602AP05938011483
AP0 7531 8512 33	part C = 48	AP0 676311602AP05938011483
AP0 7716 8521 34	part C = 48	AP0 676311602AP05938011483
AP0 7791 8465 35	part C = 48	AP0 676311602AP05938011483
AP0 7891 8411 36	part C = 48	AP0 676311602AP05938011483
AP0 7964 8305 37	part C = 48	AP0 676311602AP05938011483
APO 7818 8260 38	part C = 48	AP0 676311602AP05938011483
APO 7702 8287 39	part C = 48	AP0 676311602AP05938011483
APO 7629 8336 40	part C = 48	APO 676311602AP05938011483
AI 0 /023 0030 40	part C = 40	711 0 070011002A1 00000011400

AP010001 8359 41	part C = 49	AP0 676311602AP05938011483
AP010389 8477 42	part C = 49	AP0 676311602AP05938011483
AP010610 8454 43	part C = 49	AP0 676311602AP05938011483
AP010828 8435 44	part C = 49	AP0 676311602AP05938011483
AP011045 8367 45	part C = 49	AP0 676311602AP05938011483
AP010740 8290 46	part C = 49	AP0 676311602AP05938011483
AP010543 8301 47	part C = 49	AP0 676311602AP05938011483
AP010316 8287 48	part C = 49	AP0 676311602AP05938011483
AP011419 8403 49	part C = 50	AP0 676311602AP05938011483
AP011767 8468 50	part C = 50	AP0 676311602AP05938011483
AP011966 8435 51	part C = 50	AP0 676311602AP05938011483
AP012220 8418 52	part C = 50	AP0 676311602AP05938011483
AP012439 8283 53	part C = 50	AP0 676311602AP05938011483
AP012106 8238 54	part C = 50	AP0 676311602AP05938011483
AP011897 8284 55	part C = 50	AP0 676311602AP05938011483
AP011653 8299 56	part C = 50	AP0 676311602AP05938011483
AP012975 8234 57	part C = 51	AP0 676311602AP05938011483
AP013169 8416 58	part C = 51	AP0 676311602AP05938011483
AP013355 8431 59	part C = 51	AP0 676311602AP05938011483
AP013528 8440 60	part C = 51	AP0 676311602AP05938011483
AP013663 8412 61	part C = 51	AP0 676311602AP05938011483
AP013513 8287 62	part C = 51	AP0 676311602AP05938011483
AP013338 8251 63	part C = 51	AP0 676311602AP05938011483
AP013143 8227 64	part C = 51	AP0 676311602AP05938011483
AP015170 8372 65	part C = 52	AP0 676311602AP05938011483
AP015528 8412 66	part C = 52	AP0 676311602AP05938011483
AP015767 8397 67	part C = 52	AP0 676311602AP05938011483
AP015986 8358 68	part C = 52	AP0 676311602AP05938011483
AP016232 8253 69	part C = 52	AP0 676311602AP05938011483
AP015922 8195 70	part C = 52	AP0 676311602AP05938011483
AP015673 8227 71	part C = 52	AP0 676311602AP05938011483
AP015462 8258 72	part C = 52	AP0 676311602AP05938011483
AP018066 8379 73	part C = 53	AP0 676311602AP05938011483
AP018415 8394 74	part C = 53	AP0 676311602AP05938011483
AP018699 8379 75	part C = 53	APO 676311602AP05938011483
AP018921 8355 76	part C = 53	APO 676311602AP05938011483
AP019176 8272 77	part C = 53	APO 676311602AP05938011483
AP018911 8188 78	part C = 53	APO 676311602AP05938011483
AP018600 8221 79	part C = 53	APO 676311602AP05938011483
AP018352 8260 80	part C = 53	APO 676311602AP05938011483
AP019899 8294 81	part C = 53	APO 676311602AP05938011483
AP020379 8376 82	part C = 54	APO 676311602AP05938011483
AP020642 8358 83	part C = 54	APO 676311602AP05938011483
AP020042 8338 83 AP020994 8361 84	part C = 54	APO 676311602AP05938011483
AP021294 8261 85	part C = 54	APO 676311602AP05938011483
	part C = 54	
AP020919 8193 86	part C = 54 part C = 54	AP0 676311602AP05938011483 AP0 676311602AP05938011483
AP020567 8214 87		
AP020275 8203 88	part C = 54	APO 676311602AP05938011483
AP022082 8223 89	part C = 55	APO 676311602AP05938011483
AP022494 8317 90	part C = 55	AP0 676311602AP05938011483

AP022700 8328 91	part C = 55	AP0 676311602AP05938011483
AP023034 8354 92	part C = 55	AP0 676311602AP05938011483
AP023299 8289 93	part C = 55	AP0 676311602AP05938011483
AP022994 8186 94	part C = 55	AP0 676311602AP05938011483
AP022709 8190 95	part C = 55	AP0 676311602AP05938011483
AP022431 8172 96	part C = 55	APO 676311602AP05938011483
AP023980 8218 97	part C = 56	AP0 676311602AP05938011483
AP024156 8295 98	part C = 56	APO 676311602AP05938011483
AP024243 8316 99	part C = 56	AP0 676311602AP05938011483
AP024355 8306 100	part C = 56	AP0 676311602AP05938011483
AP024445 8250 101	part C = 56	AP0 676311602AP05938011483
AP024352 8162 102	part C = 56	AP0 676311602AP05938011483
AP024244 8141 103	part C = 56	AP0 676311602AP05938011483
AP024097 8147 104	part C = 56	AP0 676311602AP05938011483
AP025101 8225 105	part C = 57	AP0 676311602AP05938011483
AP025445 8294 106	part C = 57	AP0 676311602AP05938011483
AP025717 8306 107	part C = 57	AP0 676311602AP05938011483
AP026035 8335 108	part C = 57	AP0 676311602AP05938011483
AP026373 8290 109	part C = 57	AP0 676311602AP05938011483
AP026037 8175 110	part C = 57	AP0 676311602AP05938011483
AP025730 8165 111	part C = 57	AP0 676311602AP05938011483
AP025434 8156 112	part C = 57	AP0 676311602AP05938011483
AP027915 8272 113	part C = 58	APO 676311602AP05938011483
AP028140 8305 114	part C = 58	AP0 676311602AP05938011483
AP028316 8288 115	part C = 58	AP0 676311602AP05938011483
AP028496 8238 116	part C = 58	AP0 676311602AP05938011483
AP028738 8166 117	part C = 58	AP0 676311602AP05938011483
AP028477 8113 118	part C = 58	AP0 676311602AP05938011483
AP028292 8129 119	part C = 58	AP0 676311602AP05938011483
AP028113 8152 120	part C = 58	AP0 676311602AP05938011483
AP029882 8139 121	part C = 59	AP0 676311602AP05938011483
AP030050 8270 122	part C = 59	AP0 676311602AP05938011483
AP030277 8360 123	part C = 59	AP0 676311602AP05938011483
AP030417 8380 124	part C = 59	AP0 676311602AP05938011483
AP030573 8356 125	part C = 59	AP0 676311602AP05938011483
AP030389 8241 126	part C = 59	AP0 676311602AP05938011483
AP030269 8192 127	part C = 59	AP0 676311602AP05938011483
AP030141 8150 128	part C = 59	AP0 676311602AP05938011483
AP031470 8009 129	part C = 60	AP0 676311602AP05938011483
AP031478 8187 130	part C = 60	AP0 676311602AP05938011483
AP031551 8242 131	part C = 60	AP0 676311602AP05938011483
AP031642 8336 132	part C = 60	AP0 676311602AP05938011483
AP031779 8391 133	part C = 60	AP0 676311602AP05938011483
AP031735 8276 134	part C = 60	AP0 676311602AP05938011483
AP031669 8191 135	part C = 60	AP0 676311602AP05938011483
AP031618 8108 136	part C = 60	APO 676311602AP05938011483
AP033114 8162 137	part C = 61	APO 676311602AP05938011483
AP033520 8295 138	part C = 61	APO 676311602AP05938011483
AP034005 8339 139	part C = 61	APO 676311602AP05938011483
AP034343 8358 140	part C = 61	AP0 676311602AP05938011483

AP034743 8315 141	part C = 61	AP0 676311602AP05938011483
AP034338 8181 142	part C = 61	AP0 676311602AP05938011483
AP033916 8186 143	part C = 61	AP0 676311602AP05938011483
AP033572 8163 144	part C = 61	AP0 676311602AP05938011483
AP036285 8110 145	part C = 62	AP0 676311602AP05938011483
AP036456 8248 146	part C = 62	APO 676311602AP05938011483
AP036558 8288 147	part C = 62	AP0 676311602AP05938011483
AP036656 8289 148	part C = 62	AP0 676311602AP05938011483
AP036849 8272 149	part C = 62	AP0 676311602AP05938011483
AP036720 8141 150	part C = 62	AP0 676311602AP05938011483
AP036621 8092 151	part C = 62	AP0 676311602AP05938011483
AP036467 8084 152	part C = 62	AP0 676311602AP05938011483
AP037440 8296 153	part C = 63	AP0 676311602AP05938011483
AP037666 8373 154	part C = 63	AP0 676311602AP05938011483
AP037830 8356 155	part C = 63	AP0 676311602AP05938011483
AP037942 8357 156	part C = 63	AP0 676311602AP05938011483
AP038105 8284 157	part C = 63	AP0 676311602AP05938011483
AP037979 8170 158	part C = 63	AP0 676311602AP05938011483
AP037790 8179 159	part C = 63	AP0 676311602AP05938011483
AP037790 8179 139 AP037613 8212 160	part C = 63	AP0 676311602AP05938011483
AP039465 8284 161	part C = 64	AP0 676311602AP05938011483
AP039718 8383 162	part C = 64	AP0 676311602AP05938011483
AP039928 8396 163	part C = 64	AP0 676311602AP05938011483
AP040093 8388 164	part C = 64	AP0 676311602AP05938011483
AP040295 8321 165	part C = 64	AP0 676311602AP05938011483
AP040066 8239 166	part C = 64	AP0 676311602AP05938011483
AP039898 8214 167	part C = 64	AP0 676311602AP05938011483
AP039724 8218 168	part C = 64	AP0 676311602AP05938011483
AP042091 8309 169	part C = 65	AP0 676311602AP05938011483
AP042458 8403 170	part C = 65	AP0 676311602AP05938011483
AP042792 8404 171	part C = 65	AP0 676311602AP05938011483
AP043049 8393 172	part C = 65	AP0 676311602AP05938011483
AP043245 8301 173	part C = 65	AP0 676311602AP05938011483
AP042961 8207 174	part C = 65	AP0 676311602AP05938011483
AP042618 8225 175	part C = 65	AP0 676311602AP05938011483
AP042345 8212 176	part C = 65	AP0 676311602AP05938011483
AP044319 8371 177	part C = 66	AP0 676311602AP05938011483
AP044650 8403 178	part C = 66	AP0 676311602AP05938011483
AP044815 8381 179	part C = 66	AP0 676311602AP05938011483
AP044975 8326 180	part C = 66	AP0 676311602AP05938011483
AP045142 8225 181	part C = 66	AP0 676311602AP05938011483
AP044920 8152 182	part C = 66	AP0 676311602AP05938011483
AP044717 8184 183	part C = 66	AP0 676311602AP05938011483
AP044530 8243 184	part C = 66	AP0 676311602AP05938011483
AP046098 8368 185	part C = 67	AP0 676311602AP05938011483
AP046269 8423 186	part C = 67	AP0 676311602AP05938011483
AP046368 8408 187	part C = 67	APO 676311602AP05938011483
AP046468 8373 188	part C = 67	APO 676311602AP05938011483 APO 676311602AP05938011483
AP046555 8288 189	part C = 67	APO 676311602AP05938011483 APO 676311602AP05938011483
AP046457 8238 190	part C = 67	APO 676311602AP05938011483 APO 676311602AP05938011483
AF 040407 0230 190	part C = 07	A 0 0700 1 1002 A 1 003300 1 1403

AP046363 8235 191	part C = 67	AP0 676311602AP05938011483
AP046255 8256 192	part C = 67	AP0 676311602AP05938011483
AP046993 8160 193	part C = 68	AP0 676311602AP05938011483
AP047122 8262 194	part C = 68	AP0 676311602AP05938011483
AP047266 8285 195	part C = 68	AP0 676311602AP05938011483
AP047374 8288 196	part C = 68	AP0 676311602AP05938011483
AP047531 8223 197	part C = 68	AP0 676311602AP05938011483
AP047418 8120 198	part C = 68	AP0 676311602AP05938011483
AP047270 8117 199	part C = 68	AP0 676311602AP05938011483
AP047147 8134 200	part C = 68	AP0 676311602AP05938011483
AP048767 8124 201	part C = 69	APO 676311602AP05938011483
AP049208 8270 202	part C = 69	AP0 676311602AP05938011483
AP049404 8279 203	part C = 69	APO 676311602AP05938011483
AP049619 8309 204	part C = 69	AP0 676311602AP05938011483
	part C = 69	APO 676311602APO5938011483
AP049838 8275 205	part C = 69	APO 676311602AP05938011483
AP049590 8151 206	part C = 69	APO 676311602APO5938011483
AP049345 8119 207		
AP049112 8088 208	part C = 69	APO 676311602AP05938011483
AP051770 8100 209	part C = 70	APO 676311602AP05938011483
AP052020 8219 210	part C = 70	APO 676311602AP05938011483
AP052232 8247 211	part C = 70	APO 676311602AP05938011483
AP052430 8237 212	part C = 70	AP0 676311602AP05938011483 AP0 676311602AP05938011483
AP052634 8188 213	part C = 70	
AP052477 8088 214	part C = 70	APO 676311602AP05938011483
AP052271 8053 215	part C = 70	APO 676311602AP05938011483
AP052065 8052 216	part C = 70	APO 676311602AP05938011483
AP052625 8163 217	part C = 71	APO 676311602AP05938011483
AP052817 8237 218	part C = 71	APO 676311602AP05938011483
AP052993 8278 219	part C = 71	APO 676311602AP05938011483
AP053204 8281 220	part C = 71	APO 676311602AP05938011483
AP053388 8242 221	part C = 71	AP0 676311602AP05938011483 AP0 676311602AP05938011483
AP053140 8122 222	part C = 71	APO 676311602APO5938011483
AP053012 8095 223	part C = 71	APO 676311602AP05938011483
AP052863 8103 224	part C = 71	APO 676311602APO5938011483
AP055655 8167 225	part C = 72	APO 676311602APO5938011483
AP055821 8222 226	part C = 72	APO 676311602APO5938011483
AP055959 8218 227	part C = 72	AP0 676311602AP05938011483
AP056080 8172 228	part C = 72	APO 676311602APO5938011483
AP056232 8107 229	part C = 72	APO 676311602APO5938011483
AP056106 8030 230	part C = 72	APO 676311602APO5938011483
AP055949 8008 231	part C = 72	
AP055853 8035 232	part C = 72	APO 676311602AP05938011483
AP056799 8346 233	part C = 73	APO 676311602AP05938011483
AP056937 8370 234	part C = 73	APO 676311602AP05938011483
AP057065 8351 235	part C = 73	AP0 676311602AP05938011483 AP0 676311602AP05938011483
AP057178 8292 236	part C = 73	
AP057263 8175 237	part C = 73	APO 676311602AP05938011483
AP057117 8155 238	part C = 73	APO 676311602AP05938011483
AP057017 8192 239	part C = 73	APO 676311602AP05938011483
AP056919 8248 240	part C = 73	AP0 676311602AP05938011483

AP057619 8193 241	part C = 74	AP0 676311602AP05938011483
AP057806 8295 242	part C = 74	AP0 676311602AP05938011483
AP057973 8285 243	part C = 74	AP0 676311602AP05938011483
AP058105 8285 244	part C = 74	AP0 676311602AP05938011483
AP058278 8178 245	part C = 74	AP0 676311602AP05938011483
AP058126 8120 246	part C = 74	AP0 676311602AP05938011483
AP057982 8096 247	part C = 74	AP0 676311602AP05938011483
AP057847 8109 248	part C = 74	AP0 676311602AP05938011483
AP058943 8164 249	part C = 75	AP0 676311602AP05938011483
AP059142 8282 250	part C = 75	AP0 676311602AP05938011483
AP059367 8307 251	part C = 75	AP0 676311602AP05938011483
AP059551 8309 252	part C = 75	AP0 676311602AP05938011483
AP059783 8254 253	part C = 75	AP0 676311602AP05938011483
AP059597 8145 254	part C = 75	AP0 676311602AP05938011483
AP059411 8112 255	part C = 75	AP0 676311602AP05938011483
AP059229 8103 256	part C = 75	AP0 676311602AP05938011483
APO 8162 8167 257	part C = 76	AP0 679511415AP05525811545
APO 8336 8245 258	part C = 76	AP0 679511415AP05525811545
APO 8486 8243 259	part C = 76	AP0 679511415AP05525811545
APO 8656 8186 260	part C = 76	APO 679511415AP05525811545
APO 8836 8130 261	part C = 76	AP0 679511415AP05525811545
APO 8655 8068 262	part C = 76	AP0 679511415AP05525811545
APO 8473 8062 263	part C = 76	APO 679511415AP05525811545
APO 8337 8094 264	part C = 76	AP0 679511415AP05525811545
AP010769 8074 265	part C = 70	APO 679511415AP05525811545
AP010709 8074 205 AP011251 8164 266	part C = 77	APO 679511415APO5525811545
		APO 679511415APO5525811545
AP011640 8167 267 AP012108 8144 268	part C = 77 part C = 77	APO 679511415APO5525811545 APO 679511415APO5525811545
AP012557 8035 269	part C = 77	APO 679511415APO5525811545
AP012337 8033 269 AP012108 7964 270	part C = 77	APO 679511415APO5525811545 APO 679511415APO5525811545
AP012108 7964 270 AP011695 7964 271	The state of the s	APO 679511415APO5525811545
AP011095 7904 271 AP011224 7988 272	part C = 77	APO 679511415APO5525811545 APO 679511415APO5525811545
	part C = 77	APO 679511415APO5525811545 APO 679511415APO5525811545
AP015140 7975 273	part C = 78	APO 679511415APO5525811545 APO 679511415APO5525811545
AP015460 8043 274	part C = 78	
AP015717 8034 275	part C = 78	APO 679511415AP05525811545 APO 679511415AP05525811545
AP015917 8018 276	part C = 78	APO 679511415APO5525811545 APO 679511415APO5525811545
AP016218 8028 277	part C = 78	내는 대학생자들과 대장에 대한 주니다. 아니라 아그리고 하네 내려가가 프라마 하네가, 이 아니라는 때 그녀.
AP015981 7859 278	part C = 78	APO 679511415AP05525811545
AP015700 7859 279	part C = 78	APO 679511415AP05525811545
AP015492 7871 280	part C = 78	APO 679511415APO5525811545
AP018021 7886 281	part C = 79	APO 679511415AP05525811545
AP018406 7979 282	part C = 79	APO 679511415AP05525811545
AP018658 7950 283	part C = 79	APO 679511415AP05525811545
AP018934 7889 284	part C = 79	APO 679511415AP05525811545
AP019187 7849 285	part C = 79	APO 679511415AP05525811545
AP018953 7752 286	part C = 79	APO 679511415AP05525811545
AP018633 7751 287	part C = 79	APO 679511415AP05525811545
AP018406 7774 288	part C = 79	APO 679511415AP05525811545
AP020451 7890 289	part C = 80	APO 679511415AP05525811545
AP020783 7968 290	part C = 80	AP0 679511415AP05525811545

AP020979 7935 291	part C = 80	AP0 679511415AP05525811545
AP021168 7899 292	part C = 80	AP0 679511415AP05525811545
AP021333 7785 293	part C = 80	AP0 679511415AP05525811545
AP021063 7728 294	part C = 80	AP0 679511415AP05525811545
AP020903 7719 295	part C = 80	AP0 679511415AP05525811545
AP020744 7765 296	part C = 80	AP0 679511415AP05525811545
AP023407 7800 297	part C = 81	AP0 679511415AP05525811545
AP023759 7826 298	part C = 81	AP0 679511415AP05525811545
AP024008 7792 299	part C = 81	AP0 679511415AP05525811545
AP024242 7758 300	part C = 81	AP0 679511415AP05525811545
AP024401 7659 301	part C = 81	AP0 679511415AP05525811545
AP024212 7572 302	part C = 81	AP0 679511415AP05525811545
AP023976 7619 303	part C = 81	AP0 679511415AP05525811545
AP023749 7658 304	part C = 81	AP0 679511415AP05525811545
AP025510 7896 305	part C = 82	AP0 679511415AP05525811545
AP025772 7885 306	part C = 82	AP0 679511415AP05525811545
AP025966 7828 307	part C = 82	AP0 679511415AP05525811545
AP026108 7750 308	part C = 82	AP0 679511415AP05525811545
AP026325 7578 309	part C = 82	AP0 679511415AP05525811545
AP026087 7546 310	part C = 82	AP0 679511415AP05525811545
AP025914 7572 311	part C = 82	AP0 679511415AP05525811545
AP025740 7644 312	part C = 82	AP0 679511415AP05525811545
AP028373 7639 313	part C = 83	AP0 679511415AP05525811545
AP028748 7740 314	part C = 83	AP0 679511415AP05525811545
AP029045 7754 315	part C = 83	AP0 679511415AP05525811545
AP029329 7748 316	part C = 83	AP0 679511415AP05525811545
AP029639 7669 317	part C = 83	AP0 679511415AP05525811545
AP029443 7564 318	part C = 83	AP0 679511415AP05525811545
AP029194 7559 319	part C = 83	AP0 679511415AP05525811545
AP028878 7569 320	part C = 83	AP0 679511415AP05525811545
AP029881 7629 321	part C = 84	AP0 679511415AP05525811545
AP030223 7703 322	part C = 84	AP0 679511415AP05525811545
AP030572 7720 323	part C = 84	AP0 679511415AP05525811545
AP030888 7736 324	part C = 84	AP0 679511415AP05525811545
AP031156 7647 325	part C = 84	AP0 679511415AP05525811545
AP030898 7551 326	part C = 84	AP0 679511415AP05525811545
AP030567 7558 327	part C = 84	AP0 679511415AP05525811545
AP030292 7542 328	part C = 84	AP0 679511415AP05525811545
AP032484 7541 329	part C = 85	AP0 679511415AP05525811545
AP032741 7665 330	part C = 85	AP0 679511415AP05525811545
AP032953 7688 331	part C = 85	AP0 679511415AP05525811545
AP033123 7654 332	part C = 85	AP0 679511415AP05525811545
AP033339 7562 333	part C = 85	AP0 679511415AP05525811545
AP033177 7441 334	part C = 85	AP0 679511415AP05525811545
AP032997 7410 335	part C = 85	AP0 679511415AP05525811545
AP032819 7445 336	part C = 85	AP0 679511415AP05525811545
AP034387 7627 337	part C = 86	AP0 679511415AP05525811545
AP034601 7596 338	part C = 86	AP0 679511415AP05525811545
AP034676 7532 339	part C = 86	AP0 679511415AP05525811545
AP034795 7424 340	part C = 86	AP0 679511415AP05525811545
	P	

AP034831 7317 341	part C = 86	AP0 679511415AP05525811545
AP034683 7303 342	part C = 86	AP0 679511415AP05525811545
AP034556 7381 343	part C = 86	AP0 679511415AP05525811545
AP034459 7469 344	part C = 86	AP0 679511415AP05525811545
AP035652 7448 345	part C = 87	AP0 679511415AP05525811545
AP035996 7520 346	part C = 87	AP0 679511415AP05525811545
AP036238 7496 347	part C = 87	AP0 679511415AP05525811545
AP036432 7477 348	part C = 87	AP0 679511415AP05525811545
AP036725 7319 349	part C = 87	AP0 679511415AP05525811545
AP036508 7224 350	part C = 87	APO 679511415AP05525811545
AP036304 7238 351	part C = 87	APO 679511415AP05525811545
AP036052 7305 352	part C = 87	APO 679511415AP05525811545
AP037196 7347 353	part C = 88	APO 679511415AP05525811545
AP037190 7347 333 AP037326 7422 354	part C = 88	APO 679511415AP05525811545
AP037541 7413 355	part C = 88	APO 679511415AP05525811545
AP037670 7382 356	part C = 88	APO 679511415AP05525811545
AP037858 7257 357	part C = 88	APO 679511415AP05525811545
AP037720 7176 358	part C = 88	APO 679511415AP05525811545
AP037571 7160 359	part C = 88	APO 679511415AP05525811545
AP037443 7191 360	part C = 88	APO 679511415APO5525811545
AP038955 7301 361	part C = 89	APO 679511415APO5525811545
AP039195 7326 362	part C = 89	AP0 679511415AP05525811545
AP039278 7293 363	part C = 89	AP0 679511415AP05525811545
AP039405 7246 364	part C = 89	AP0 679511415AP05525811545
AP039586 7101 365	part C = 89	AP0 679511415AP05525811545
AP039442 7064 366	part C = 89	AP0 679511415AP05525811545
AP039302 7103 367	part C = 89	AP0 679511415AP05525811545
AP039119 7164 368	part C = 89	AP0 679511415AP05525811545
AP040105 7175 369	part C = 90	AP0 679511415AP05525811545
AP040405 7239 370	part C = 90	AP0 679511415AP05525811545
AP040635 7248 371	part C = 90	AP0 679511415AP05525811545
AP040850 7212 372	part C = 90	AP0 679511415AP05525811545
AP041079 7069 373	part C = 90	AP0 679511415AP05525811545
AP040931 6967 374	part C = 90	AP0 679511415AP05525811545
AP040695 6983 375	part C = 90	AP0 679511415AP05525811545
AP040455 7044 376	part C = 90	AP0 679511415AP05525811545
AP042553 7085 377	part C = 91	AP0 679511415AP05525811545
AP043032 7274 378	part C = 91	AP0 679511415AP05525811545
AP043326 7257 379	part C = 91	AP0 679511415AP05525811545
AP043773 7161 380	part C = 91	AP0 679511415AP05525811545
AP044112 6957 381	part C = 91	AP0 679511415AP05525811545
AP043719 6858 382	part C = 91	AP0 679511415AP05525811545
AP043384 6886 383	part C = 91	AP0 679511415AP05525811545
AP042918 6926 384	part C = 91	AP0 679511415AP05525811545
AP044448 7051 385	part C = 92	APO 679511415AP05525811545
AP044515 7095 386	part C = 92	AP0 679511415AP05525811545
AP044560 7102 387	part C = 92	AP0 679511415AP05525811545
AP044628 7104 388	part C = 92	AP0 679511415AP05525811545
AP044723 7080 389	part C = 92	APO 679511415AP05525811545
AP044674 7033 390	part C = 92	AP0 679511415AP05525811545

AP044629 7020 391	part C = 92	AP0 679511415AP05525811545
AP044553 7032 392	part C = 92	AP0 679511415AP05525811545
AP047119 6709 393	part C = 93	AP0 679511415AP05525811545
AP047732 6842 394	part C = 93	AP0 679511415AP05525811545
AP048512 6825 395	part C = 93	AP0 679511415AP05525811545
AP049383 6960 396	part C = 93	AP0 679511415AP05525811545
AP049893 6814 397	part C = 93	AP0 679511415AP05525811545
AP049402 6531 398	part C = 93	AP0 679511415AP05525811545
AP048858 6456 399	part C = 93	AP0 679511415AP05525811545
AP048160 6572 400	part C = 93	AP0 679511415AP05525811545
AP020864 4814 1	part A = 1	AP0 679511415AP05525811545
AP0 897116986 2	part A = 2	AP0 679511415AP05525811545

REFERENCES

- Chou, P.C.; Carleone, J.; and Walters, W.P.; "The Virtual Origin Approximation In Hemispherical Charges and Shaped Charges", Contract Report ARBRL-CR-00460, Dyna East Corp., PA, July 1981.
- Pearson, J; Baker, E.L.; Orosz, J.P; Pham, J.P; Vuong, T.H; and Daniels, A.S., "New Data on Copper Lined and Other Shaped Charge Devices Providing Confirmation of The Walsh Jet Break Up Theory," Technical Report ARWEC-TR-03013, U.S. Army Armament Research, Development and Engineering Center, Picatinny, New Jersey, May 2004.
- 3. Vuong, T. H., Private Communication, July 2005.

DISTRIBUTION LIST

U.S. Army ARDEC ATTN: AMSRD-AAR-EMK AMSRD-AAR-GC AMSRD-AAR-AEE-W (12) Picatinny, NJ 07806-5000

Defense Technical Information Center (DTIC) ATTN: Accessions Division 8725 John J. Kingman Road, Ste 0944 Fort Belvoir, VA 22060-6218

Commander Soldier and Biological/Chemical Command ATTN: AMSSB-CII, Library Aberdeen Proving Ground, MD 21010-5423

Director
U.S. Army Research Laboratory
ATTN: AMSRL-CI-LP, Technical Library
Bldg 4600
Aberdeen Proving Ground, MD 21005-5066

Chief
Benet Weapons Laboratory, CCAC
Armament Research, Development and Engineering Center
U.S. Army Research, Development and Engineering Command
ATTN: AMSRD-AAR-AEW
Watervliet, NY 12189-5000

Director
U.S. Army TRADOC Analysis Center-WSMR
ATTN: ATRC-WSS-R
White Sands Missile Range, NM 88002

Chemical Propulsion Information Agency For contractor releasable report, ATTN: Accessions unclassified and classified 10630 Little Patuxent Parkway, Suite 202 Columbia, MD 21044-3204

GIDEP Operations Center P.O. Box 8000 Corona, CA 91718-8000